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ORGAN OF THE AMERICAN ASSOCIATION OF THE HISTORY OF MEDICINE AND THE JOHNS HOPKINS INSTITUTE OF THE HISTORY OF MEDICINE

Editor—HENRY E. SIGERIST

Associate Editor—GENEVIEVE MILLER

VOLUME XXI MAY–JUNE, 1947 NUMBER 3

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GALL AND THE PHRENOLOGICAL MOVEMENT

OWSEI TEMKIN

INTRODUCTION

In the minds of most people, " phrenology " is associated with the doubtful art of reading a person's character from the configuration of his skull. A smaller number will also know that Gall, the founder of this art, was a renowned neurologist and the godfather of the principle of cortical localization of mental faculties. Only a few, however, will remember that phrenology in the first half of the 19th century represented a widespread movement transcending by far the circle of scientists and psychologists and affecting philosophy, religion, education and literature. To indicate the breadth of the movement, it may suffice to state that men like Broussais, Bouillaud, Abernethy among physicians,[1] Auguste Comte and Herbert Spencer

[1] Regarding Broussais and Bouillaud *cf.* below pp. 280 and 292; for Abernethy *cf.* his (1) *Physiological Lectures*, p. 89. The number of physicians favorably inclined to phrenology was, of course, much greater and the list of testimonials in favor of phrenology and George Combe, printed in Gibbon's (47) biography, vol. 1, p. 318 ff. gives an approximate idea of the status in 1836.

among philosophers,[2] Balzac, Baudelaire, George Eliot and Poe among literary men,[3] Horace Mann among educators, and Cobden among political writers,[4] showed definite leanings toward phrenology. The complete history of this movement has still to be written.[5] The aim of the present paper is to indicate its complex character and to show that this complexity was rooted in the teachings of Gall himself which reveal two distinct aspects. A brief biographical introduction will sketch the origin of Gall's endeavors, the next part will deal with Gall's naturalism, and the last part will discuss the metaphysical element of his thought. Relatively little attention will be paid to the strictly phrenological (i. e. cranioscopic and organological) aspect of Gall's work, since this part is best known and has received competent consideration.[6]

Franz Joseph Gall was born on March 9, 1758 in Tiefenbrunn, in the German state of Baden. He studied first in Strasbourg, then from 1781 on in Vienna where he obtained his M. D. degree in 1785 and set up in practice. In 1791 he published *Philosophisch-medicinische Untersuchungen über Natur und Kunst im kranken und gesunden Zustande des Menschen.* This work is important because it expresses views on the relationship of body and soul, and of man and his surroundings which show the early formation as well as unity of his basic beliefs. It will, therefore, be discussed in more detail in the appendix to the present essay. The genesis of Gall's phrenological ideas must, however, be looked for in a different direction.

During Gall's formative years, physiognomy, i. e. "the art of

[2] *Cf.* below pp. 295 and 312.

[3] *Cf.* Clapton (21), pp. 260 f., 278 f. and *passim*, and below p. 313.

[4] *Cf.* below p. 311.

[5] Riegel (95, 96) has made an interesting attempt in this direction regarding the United States and Delaunay (31) regarding France.

[6] *Cf.* Macalister (73), Froriep (42), and, in defense of phrenology: Möbius (76) and Hollander (53, 54). Gall's doctrine of isolated psychic faculties and their anatomical localization has been reviewed by Riese (97, 98) in two articles to which Dr. E. Ackerknecht kindly drew my attention. At this point already I should like to mention Blondel's (6) book with which the present paper meets in many respects.

judging character and disposition from the features of the face or the form and lineaments of the body generally" (Oxford Dictionary), was in great vogue, largely due to the enthusiastic efforts of Lavater. The origin of Gall's work must be seen in the framework of this movement.[6a] As a boy already, Gall had been impressed by a correspondence between the talents of his fellow pupils and their features. Those for instance who excelled by their memory showed prominent eyes.[7] During the nineties, while practising medicine in Vienna, Gall reverted to his earlier observations in a more serious manner. His attention became centered upon the formation of the skull, and he began to gather experiences which led him to renounce the psychological classification of his time and to develop his own method of observation.

> For many years he endeavored to discover external signs in the head, corresponding to the general powers spoken of by metaphysicians, such as perception, conception, memory, imagination, and judgment; but not being able to advance, and finding contradictions and exceptions without end, he compared great talents for music, mechanical arts, drawing, painting, dramatic acting, poetry, philology, mathematics, and metaphysics, and since he succeeded with respect to the intellectual functions, he also looked to the head for signs of the different characters.[8]

But, not satisfied with mere craniology and cranioscopy, Gall took a definite turn away from physiognomy in favor of cerebral physiology. The physiognomist reads man's features as *expressing* his character. He is, therefore, free to believe in a soul which pictures itself in the shape of the body, similarly to God's creation of man in His own image.[9] Gall, however, did not read the configuration of the skull as an *expression* of man's instincts, inclinations and talents. "The object of my researches is the brain. The cranium is only a faithful cast of the external surface of the brain, and is, consequently,

[6a] *Cf.* Froriep (42) p. 38.

[7] Gall-Spurzheim (44) vol. 1, p. ii.

[8] Spurzheim (114) vol. 1, p. 10. Cf. also Gall's own testimony in his letter of 1798 to von Retzer, an English translation of which appeared in Capen (19) pp. 70-86.

[9] Significantly enough Lavater (65) chose as the motto of his work (vol. 1, title page): "God created man after His own image." *Cf.* Delaunay (31) p. 1242.

but a minor part of the principal object." [10] In other words, Gall considered the human character and intellect as the function of an organ, or rather as the combined functions of many organs localized on the surface of the brain. Thus it is understandable why physiognomy, suitably associated with art, could be cultivated during the period of romanticism and " Naturphilosophie " in Germany, whereas Gall's doctrine was considered materialistic, and was violently opposed by the idealistic natural philosophers in his own country.[11]

The accusation of endangering morality and religion was leveled against Gall in 1801/2 when the government forbade the private lectures which he was wont to deliver in Vienna before a numerous and highly fashionable audience.[12] These lectures had made Gall's teachings known long before he published any comprehensive exposition of his doctrine.[13] Also it had been at one of these lectures in 1800 that Johann Caspar Spurzheim (1776-1832) first became acquainted with Gall's thought. Spurzheim was then studying medicine in Vienna where he had gone in 1799 after the French invasion of Treves had put an end to his theological studies.[14] According to Spurzheim, it was only after 1800 that Gall started upon his anatomical researches on the structure of the brain,[15] first with the assistance of a young student, Niclas,[16] and from 1804 on with the very active help of Spurzheim [17] who for about eight years became his close coworker. These anatomical labors were the subject of a memoir which Gall and Spurzheim in 1808 submitted to the Institut de France.[18]

[10] Gall in Capen (19) p. 85.

[11] One of the first to have sensed materialism and denial of moral liberty in Gall's teachings was the Danish poet W. Schack von Staffeldt (1769-1826) who visited Vienna in 1796, *cf.* Neuburger (85) pp. 158, footnote; 164 and 165. In 1805 the enmity between Gall and the " Naturphilosophen," especially Steffens, was already notorious as is evidenced from contemporary letters; *cf.* Ebstein (35) p. 292 f. A. W. Schlegel, while denouncing the " crass materialism " of Gall, assigned physiognomy to the sphere of fine arts; *cf.* Gode-von Aesch (48) p. 223, footnote 23.

[12] *Cf.* Möbius (76) p. 8 f.

[13] *Cf.* above note 11. The first, but very short, outline by Gall himself was his latter to von Retzer which was published in 1798; *cf.* also above note 8.

[14] *Cf.* Capen's biography of Spurzheim (113) p. 12.

[15] Spurzheim (112) p. xviii.

[16] *Ibid.*

[17] Spurzheim (114) vol. i, p. 12.

[18] *Cf.* below p. 317 no. 46.

Gall's reputation as an anatomist was very great in his day. He did not prove the existence of morphologically different areas which would correspond to the cerebral organs his doctrine assumed. But he presented a picture of the brain that did not contradict his physiological assumptions, and he established some facts which have remained of permanent value.[19] In contrast to most of his contemporaries, Gall did not dissect the brain by slicing it from top to bottom and thereby destroying the connection of its various parts.[20] Instead he tried to show the course of nervous fibres and their relationship to the various gray masses from which they derived and in which they ended (as he believed). He claimed to have demonstrated "that the convolutions of the brain are nothing but the peripheral expansion of the fascicles of which it is composed: consequently, the convolutions of the brain must be recognized as the parts where the instincts, sentiments, penchants, talents and, in general, the moral and intellectual forces are exercised." [21] On the other hand, the anatomy of the brain did not show any convergence of all fibres to one point which might suggest the seat of the soul.[22]

In 1805 Gall left Vienna and, accompanied by Spurzheim, set out on a lecture tour through Germany and adjacent countries.[23] His success was sensational, though the comments were not all favorable and included attacks against his doctrine as well as his personal character. In 1807 he reached Paris as a man of international fame. In this city he remained to the end of his life and here he published his main and most comprehensive work, the *Anatomie et physiologie du système nerveux en général, et du cerveau en particulier, avec des observations sur la possibilité de reconnoitre plusieurs dispositions intellectuelles et morales de l'homme et des animaux, par la configura-*

[19] Among these may be mentioned the fibrous composition of the white substance of the central nervous system in contrast to the gray masses which are the organic nutritional matrix of nerve fibres, and the final confirmation of the decussation of the pyramids; *cf.* Neuburger (86) pp. 53 and 320, and Ebstein (35) p. 320.

[20] Gall-Spurzheim (46) *passim.*

[21] Gall (43) vol. 2, p. 13 f.

[22] *Cf.* Gall-Spurzheim (46) p. 168. I deal with these anatomical questions in a paper to be published shortly.

[23] For this phase of Gall's life *cf.* especially Ebstein (35).

tion de leurs têtes. The work comprised four large folio volumes and was accompanied by an atlas. The first two volumes (1810 and 1812) bear the names of both Gall and Spurzheim, whereas the remaining two volumes (1818 and 1819) have Gall as the sole author. While the second volume was being prepared, Spurzheim had departed for England in order to spread the doctrine in that country.[24] This departure was the beginning of a rift between the two men. Spurzheim began to publish under his own name, deviating in many points from Gall's concepts. He gave a new name to the whole system, calling it "phrenology," a name which he derived from the Greek word "phrēn" for mind and defined as "the doctrine of the special phenomena of the mind, and of the relations between the mental dispositions and the body, particularly the brain."[25] "Phrenology" has become the commonly accepted term for Gall's and Spurzheim's work in spite of the former's reluctance. When in 1822 Gall began to bring out a revised and handier edition of his main work, he did not adopt the name of "phrenology," but gave it the title of *Sur les fonctions du cerveau et sur celles de chacune de ses parties.* This revised edition was Gall's last contribution to his science. He died in Paris in 1828 when the reputation of phrenology was beginning to pale among experimental physiologists. During Gall's lifetime already, Flourens had begun his well-known experimental researches which assigned regulation of locomotor movements to the cerebellum, the respiratory center to the medulla oblongata, the sense of sight to the corpora quadrigemina, and intelligence as a whole to the hemispheres as a whole. On the other hand, Gall had found a supporter in Bouillaud who, as early as 1825, had postulated the existence of a motor speech center in the anterior part of the brain, a postulate that was to be confirmed by Broca in 1861. But, outside the circle of physiologists, the phrenological movement was still very strong and some of its most important manifestations

[24] Gall-Spurzheim (44) vol. 2, p. 147, footnote: "M. le docteur Spurzheim ayant quitté Paris pour enseigner en Angleterre la doctrine des fonctions du cerveau, et pour continuer de recueillir des faits nouveaux, il ne concourt plus à la rédaction de cet ouvrage." Strictly speaking, therefore, Spurzheim's collaboration in the main work extends only over vol. 1 and pp. 1-146 of vol. 2.

[25] Spurzheim (114) vol. 1, p. 12.

were still to come. The movement did not rest on the outcome of scientific experiments alone, but to a higher degree on the vitality of certain philosophical principles. The best proof for this thesis is given by Flourens himself. As commonly assumed it was Flourens' book against phrenology, published in 1843, that proved fatal to phrenology. And, while in this book Flourens' experimental results figured as a weighty argument, they were an argument only to his main purpose, *viz.* to refute the philosophy of Gall and his followers.[26] The book was dedicated to Descartes in whose name Flourens defended the freedom of the human will and the unity of the soul. It is with some of the philosophical principles as propounded by Gall and utilized by his adherents that the following pages are concerned.

Naturalism

a.

Gall spent his life in two countries which were then separated not only by political barriers and linguistic differences, but by the philosophical outlook of their scientists as well. While he was laying the foundations of his system in Vienna, Kant's influence was in the ascendant and, when he finally left Germany, the idealistic schools of Fichte, Schelling and Hegel were flourishing and "Naturphilosophie" in full sway. From this movement Gall dissociated himself emphatically. As early as 1798 he asked to be excused "for not making use of the language of Kant" and ironically remarked upon his inaptitude "to arrive at knowledge *a priori*." [27] In his later works he repeatedly pronounced himself against speculative philosophy, and in no uncertain terms.[28] The belief that the world could be constructed out of the ego appeared to him as the negation of true science [29] and Gall's concept of science can hardly be described other than positiv-

[26] Flourens (39) p. xiv: "I frequently quote Descartes: I even go further for I dedicate my work to his memory. I am writing in opposition to a bad philosophy, while I am endeavouring to recall a sound one."

[27] Capen (19) pp. 72 and 86 (Gall's letter to von Retzer).

[28] Gall-Spurzheim (44) vol. 1, pp. xxvii and xxxii.

[29] *Ibid.*, p. 107.

istic.[80] He stressed his positivistic attitude with regard to the basic tenet of his whole system,[80a] *viz.* the inborn nature of man's psychic and mental faculties and their dependence upon his somatic organization (i. e. his brain). Questions pertaining to this subject had hitherto not led to a conclusive answer for lack of sufficient facts. His own method would be different. "Today we intend to put the phenomena in an orderly fashion and to expose their causes by demonstrating them by positive facts (faits positifs). We shall not present mere opinions but established truths which will at all times be capable of undergoing the proof of experience and which, consequently, must be of permanent usefulness for society." [81] Gall was very anxious to keep his definitions within the limits of possible experience. To say that the *exercise* of the faculties of soul and mind depended on material conditions did not mean that these faculties were a *product* of man's organization. "We consider the faculties of the soul only in so far as, through the medium of material organs, they become phenomena for us. And without venturing beyond the material conditions, we deny and affirm only what can be judged by experience. We carry our researches neither on the inanimate body nor on the soul alone, but on the living man, the result of the union of soul and body." [82] Whatever the decision of theologians and metaphysicians regarding the ultimate connection of body and soul may be, "our principle, to wit that the qualities of the soul and of the spirit are innate and that their manifestation depends on material organs, cannot thereby suffer the slightest alteration." [83]

This principle constituted a necessary premise for Gall's physiology of the brain, and he had to uphold it against two antagonistic doctrines. Phrenology was to be the natural science of man as a moral and intellectual being. But any such science was impossible if man's psychic qualities had no direct relationship to his organs, or if these

[80] *Cf.* Blondel (6) p. 116 ff. and Riese (97) p. 111. The term "positivistic" is here taken in its general connotation rather than as referring to Comte's philosophy. Where the latter is meant, the word will be capitalized.

[80a] *Cf.* Riese, *ibid.*, p. 109.

[81] Gall-Spurzheim (44) vol. 2, p. 3-4.

[82] *Ibid.*, p. 4. [83] *Ibid.*, p. 5.

qualities were but the accidental product of external things and our external senses.[34] In other words, Gall's defense had to be directed against spiritualists as well as extreme sensualists.

Of course few if any spiritualists of the time went as far as to deny entirely any relationship between soul and body since this would have led to absurd consequences. Moreover, Gall, as remarked, did not claim that the brain or its divisions produced these qualities. The cerebral organs were but the instruments through which the basic qualities manifested themselves. Indeed, Gall was far from being a materialist in the strict sense of the term. But he elaborated the old concept of the instrumentality of the brain in a manner which seemed destructive of man's spiritual entity and of his freedom of action. There was, in the first place, his insistence upon man's relationship to animals. With many contemporary biologists Gall believed in the chain of beings [35] where the higher forms included the characteristics of the lower ones. However, he gave this principle an orientation which was far from common. Man and animal are subject to the same laws of organization, for the latter too have their psychic qualities represented in cerebral organs. The sexual instinct (1), love of progeny (2), attachment (3), the instincts of self-defence (4) and of killing (5),[36] cunning (6), the desire to possess things (7),[37] pride (8), vanity (9), circumspection (10,) memory for facts (11), sense of locality (12), memory for persons (13), memory for words (14), sense of language (15), the sense for the relationship of color (16), of musical tones (17), and of numbers (18), and the mechanical sense (19) [38] are shared by man with many animals, and the differences are of degree, not of essence. What then gives to man his decisive superiority over animals? Gall scoffs at the ready-made answers that animals are mere machines, devoid of all feeling and of moral and intellectual principles, man alone possessing an immaterial substance endowed with will and reason; or that the same qualities which in animals are ascribed to material

[34] *Ibid.*, vol. 1, p. 106 f.
[35] *Cf.* Blondel (6) p. 50.
[36] Including the penchant to murder.
[37] Including the penchant to theft.
[38] This list as well as the following one is somewhat simplified in so far as Gall gives a wider latitude to each organ which he defines by more than the one designation chosen by me.

forces or a vital principle, in man are attributed to the soul acting independently from the body.[39] Gall proposes to solve the problem on the basis of comparative anatomy and physiology of the brain. The functions of the lower anterior part of the brain are much more highly developed in man than in animals. But the upper anterior part of man's brain does not exist in animals at all. Consequently, an analysis of the organs of this region must yield the specifically human qualities.[40] As a result, Gall supplements his organologic list by: comparative sagacity (20), spirit of metaphysics (21), wit (22), poetic talent (23), goodness (24), imitative faculty (25), religious sentiment (26) and firmness (27).[41]

It seems an imminent feature of philosophical systems, which see in man more than a natural being, to establish an inseparable gulf between animal and man. In Gall's scheme of moral and intellectual qualities such a schism does not exist.[42] Man possesses several qualities which animals lack—but none of these qualities is of a radically different nature from those shared by both. Man does not even show a special organ representing consciousness, intellect, reason or will; nor is there any such arrangement as instinct versus intellect. Gall does not recognize "intellect" as a special entity at all. Potentially there are as many "intellects" as there are qualities. Each of the latter can run the whole range from a mere instinct to a highly conscious and intelligent faculty.[43] Besides, several or even all organs can function at the same time in a cooperative manner which, even in animals, can lead to very complicated mental acts and which, in man, explains the phenomena of reason and will. "Reason," meaning the ability of recognizing general laws and principles, is "the result of a happy development of all anterior-superior parts of the brain." [44] Since these parts exist in man only, he alone can have reason and is thereby distinguished from animals. But few men are

[39] Gall-Spurzheim (44) vol. 4, p. 114.

[40] *Ibid.*, p. 115. *Cf.* Blondel (6) p. 137.

[41] Yet even these faculties are not entirely restricted to man, goodness e. g. can also be observed in animals; *cf.* Gall-Spurzheim (44) vol. 4, p. 157. *Cf.* Lélut (67) p. 40.

[42] *Cf.* Blondel (6) pp. 57 and 82.

[43] Gall-Spurzheim (44) vol. 4, p. 240.

[44] *Ibid.*, p. 126.

endowed with reason in the philosophical sense given to this word, since in a few only are *all* the specifically human organs well developed.[44] It is worth while noticing that Gall remains in the sphere of biology: the chance of becoming a philosopher depends upon the development of the brain.

A somewhat similar thought underlies Gall's theory of will and moral liberty. From the very outset he denies the possibility of unlimited or absolute moral liberty which would allow man to act without motive. "Moral liberty is nothing but the faculty of being determined and determining oneself by motives."[45] Man has no power over the existence of his desires and inclinations which depend on his organization and the circumstances stimulating it; he is obviously determined by internal and external motives. But this only accounts for the first half of the definition. Because man is endowed with a multiplicity of cerebral organs of a high order, he can choose among the motives and thereby determine himself. An animal which had one cerebral organ only would obviously be limited to one single kind of sensation and one idea and would, therefore, have no range of choice. In higher animals which possessed several organs, matters were already different. Supposing that a hungry dog were shown food, but that a hare was made to run in front of him just when the dog was on the point of eating. Still hungry, he would set out after the hare. However, if he had repeatedly been prevented by force from giving chase to the hare, he would remember the beating that awaited him and would refrain from the pursuit. "If the dog were suspectible to hunger only, or if his sole penchant and faculty were for hunting, this manner of acting would be impossible to him. Thus it is the plurality of organs which makes him susceptible of different ideas and sensations." Yet this is no moral liberty, "this

[45] Gall-Spurzheim (44) vol. 2, p. 69: "La liberté morale n'est donc autre chose que la faculté d'être déterminé et de se déterminer par des motifs." For this he quotes in a footnote (*ibid.*): "Bonnet, Palingénésie, T. I, p. 27." I have not been able to find this sentence literally in Charles Bonnet (8) La palingénésie philosophique or his (7) Essai analytique, although the whole line of thought is very similar. Gall's acquaintance with Bonnet is, of course, well known and the wide range of this relationship has been emphasized by Bentley (4) p. 110. At this point I wish to stress that the present essay is not concerned with Gall's relative originality and his sources.

faculty must be considered as a simple spontaneity or faculty of being determined by the strongest and most numerous stimuli." [46] Or, to use modern terminology, the animal may be *conditioned* but it will not have any will of its own. Only in man does " will " really exist, since his superior qualities allow him to distinguish truth from error, justice from injustice, to possess a foreknowledge of future events, sympathy and compassion. If, for instance, man is provoked to yield to the desire of vengeance, he knows " that a base action will dishonor him and that he will be considered the slave of his passions rather than the master of himself. If he throws himself into the arms of pleasure, the frightening image of his destroyed health and of his ruined domestic felicity presents itself before his eyes. The social conveniences, the shame of abusing confidence, the grievous consequences of his conduct for the beloved object, etc., all these motives act on his mind and by their force or by their number finally get the upper hand." [47]

As the last words show, even in the realm of human moral action the decision will yet fall on the side of the strongest motive. It may, therefore, well be asked whether Gall's definition of moral liberty has any justifiable claim to this designation. The spiritualists among his enemies certainly denied it: " Liberty is precisely the power to determine against all motive," Flourens objected.[48] It may also be asked whether Gall's concept of moral liberty would allow phrenology to be " grafted upon Kant's system " quite as easily as has been contended.[49] It is not the categorical imperative that Gall opposes to the motives, not man's intelligible nature against his empirical character. By necessity man decides " according to the motive which acts most powerfully upon him or which offers him the greatest good." [50] Because of this necessity, man's moral and social life still remains in the confines " of the laws of nature and of our organization." [51] This in turn enables Gall to give a rather utilitarian interpretation of social institutions and to say that " education, morals, laws and religion are indispensable auxiliaries for assuring the happiness of man since these institutions supply him with the most numerous,

[46] Gall-Spurzheim (44) vol. 2, p. 73.
[47] *Ibid.*
[48] Flourens (39) p. 42.
[49] Lange (62) vol. II, p. 338.
[50] Gall-Spurzheim (44) vol. 2, p. 74.
[51] *Ibid.*, p. 75.

most powerful and most noble motives that can induce him to act well." [51]

At this point the question arises as to how Gall could have any trust in education or any institutions which aimed at improving man. It would seem that if man's faculties for good and bad were innate and, moreover, dependent on the constitution of the brain, his character must be fixed from his very birth.

The problem of education was indeed a crucial one which Gall had met very early in his development. When his ideas and observations about the craniological differences of men began to crystallize, he had distrusted them. " A great number of philosophers and physiologists contend, I told myself, that all men are born with equal faculties and that the differences which one notices among them were due either to education or to accidental circumstances. If this is so, there cannot be any external signs of the dominant faculties and consequently the project of learning in this way how to know the functions of the diverse parts of the brain is a veritable folly." [52] The strong belief of the Enlightenment in the natural equality of man and the possibilities of education are too well known to need any elaboration. In his later work Gall chiefly pointed to Helvetius (1715-1771) as the main protagonist of the doctrine that education was all powerful in shaping man's character.[53] Gall had overcome these objections by observing that children brought up in the same environment still showed marked differences and that the teachers themselves obviously heeded to the differences of their pupils and merely admonished them to develop the gifts God had given to them.[54] Thus Gall defended the inborn nature of man against the radically sociological approach. Man's nature did not change. It differed somewhat according to nationalities and individualities but otherwise it was the same at all times.[55] But he couldn't blind himself to the fact that human culture had manifested itself differently in the course of history. Hence he was led to believe that the inborn nature of man and his surroundings combined in shaping his *manifest* behavior. The external influ-

[51] *Ibid.*, p. 75.
[52] *Ibid.*, vol. 1, p. iii.
[53] *Ibid.*, vol. 2, pp. 16 and 30 ff. *Cf.* Soury (106) p. 510.
[54] *Ibid.*, vol. 2, p. 29.
[55] *Ibid.*, vol. 1, p. iii-iv.

ences stimulated the action of the inborn faculties and supplied the necessary motives.[56] Moreover, this form of stimulation could be used to influence man's organization. The cerebral organs, like other organs of the body, were strengthened by use and weakened by disuse. Hence moral, religious and educational efforts had to stimulate the human organs and carefully avoid stimulation of the animal ones.[57] In other words, education could be effective if it was based on a scientific study of man's organization, that is, phrenology.

Gall was especially interested in the treatment of criminals, and during his lecture tour in Germany he used every opportunity to visit the jails, to examine the heads of the inmates and to compare their records with his findings. He has been rightly called a forerunner of Lombroso's idea of the born criminal.[58] With equal justice he might be called a forerunner of the idea that crime is a medical problem and the criminal a victim of his disposition and an object for well considered mental treatment. He did not go so far as to deny moral responsibility in all cases. Moreover, he asserted that punishment was a very potent means in motivating the potential malefactor to suppress his natural inclination.[59] But he emphasized that moral responsibility varied from case to case.[60] And his whole pragmatic concept of moral liberty, as well as his analysis of many examples cited, suggested that crime was the result of the preponderant development of "animal" organs, of downright mental alienation and of a lack on the part of society to provide him with sufficiently strong motives of a higher order.[61]

[56] *Ibid.*, pp. 4 and 34 f. In outlining Gall's "physiological theory of knowledge," Blondel (6) p. 154 rightly stresses the analogy with Kant. "Peut-être sommes-nous autorisé à y voir une sorte d'idéalisme organologique, une rudimentaire transposition du système de Kant, où ce sont des organes qui tiennent l'emploi de formes de la sensibilité et de catégories de l'entendement." *Cf.* also Gall-Spurzheim (44) vol. 1, p. 107 which reads as if Gall, moreover wished to mediate between German idealism and French sensualism, and Lélut (66) p. 360.

[57] Gall-Spurzheim (44) vol. 2, pp. 81 and 95.

[58] *Cf.* Neuburger (84) p. 60, note 22.

[59] Gall-Spurzheim (44) vol. 2, p. 100 ff. and 105 ff. where he even goes so far as to recommend slow and painful capital punishment in extreme cases.

[60] *Ibid.*, p. 98.

[61] *Cf. ibid.*, pp. 98-146 and Neuburger *l. c.*

b.

In 1807, the year in which Gall settled in Paris, French medical scientists were largely under the influence of a philosophical movement to which sensualism gave the dominant note.[62] Condillac had deeply influenced the physicians Bichat, Cabanis and Pinel, and Destutt de Tracy was presenting a new synthesis of their thought under the name of " idéologie." According to Destutt de Tracy, intellectual phenomena were but modifications of feeling, of which he distinguished sensibility, memory, judgment and will. Cabanis had given the physiological basis for this theory; according to him thought was produced by the brain " just as the stomach and intestines are destined to effect digestion, the liver to filter the bile, and the parotid, maxillary and sublingual glands to prepare the salivary juices." But Cabanis had made an important step beyond Condillac. Whereas the latter's attention had centered upon the sensations provided by the external senses, Cabanis had recognized the importance of internal sensations originating in the inner organs. These internal sensations accounted for instincts and passions. Similarly, Bichat had assigned the passions to the organic life as distinct from the animal life which latter was dominated by the brain. Neither Bichat nor Cabanis, however, expressed themselves with unmistakable clarity regarding the relationship of all psychic phenomena (i. e. including instincts and passions) to the central nervous system. Cabanis still adhered to the doctrine of " temperaments " as shaping man's personality.[63] Moreover, he [64] and Bichat recognized the existence of imperceptible sensibility as independent from conscious sensations.

This sensualistic movement led by the idéologues was already being decried as " materialistic " by theological traditionalists when Gall came to Paris. But Cabanis was still alive, and the truly philosophical opposition had not yet formed. Surely, then, here was a climate congenial to Gall's doctrine. The animal in man, the brain as the

[62] For the following *cf.* Temkin (119).

[63] *Cf.* Cabanis (18) p. 81 ff.

[64] Cabanis (18) p. 305 f. recognizes centers of sensibility apart from the brain and spinal cord, and on p. 501, footnote, he clearly admits a " sensibilité sans sensation " which, however, is supposed to differ from mere irritability.

organ of the soul, moral institutions as "conditioning" man for correct behavior were concepts which would hardly frighten the leaders of French scientific thought. They might hesitate to accept the details of Gall's organology and might reject his cranioscopy, but they were not likely to attack him on spiritualistic grounds.[65] Indeed, Gall and the sensualists seem to have so many points in common that Gall's name has repeatedly been associated with them.[66]

This view is not without justification. Sensibility, according to Gall, is the most general property of the nervous system.[67] But in the higher animals and in man the whole nervous system is under the dominance of the brain and sensibility is inseparable from sensation, i. e. the perception of a stimulus. Sensibility without consciousness is a contradiction in terms; the multitude of reactions which go on in our body without our being aware of them have to be explained by irritability.[68] By assigning a preponderant rôle to the brain, Gall exerted considerable influence upon contemporary medicine. The brain now was considered the unique organ of all higher functions, including instinctive urges and passions, a view particularly important for the psychiatrist and accepted even by many of Gall's adversaries.[69]

But apart from these physiological corrections, Gall criticized sensualism in a manner calculated to give it an entirely new turn. In the first place, he denied Condillac's contention that we receive our ideas and knowledge through the external senses alone. "In that case man and animals are the perpetual toy of external, fortuitous and changeable objects; the measure of the faculties has no other base than the perfection of the senses; and education whose goal should be to make of individuals and of nations what one wishes has no other secret than to calculate duly the action of the outside on

[65] *Cf.* Temkin (118).

[66] In the philosophical literature this tradition apparently goes back to Damiron (30) although he was doubtful of making Gall a mere sensualist. Dilthey (34) p. 534-35 mentions the following as the main representatives of the French sensualist school: "Condillac, Cabanis, . . . Destutt de Tracy, . . . Volney, und die Vertreter der physiologischen Begründung der Psychologie, Broussais und Gall." I owe this passage to the courtesy of Dr. George Rosen.

[67] Gall-Spurzheim (44) vol. 4, p. 227.

[68] *Ibid.*, vol. 1, pp. 58 and 60 f.

[69] *Cf.* Flourens (39) p. 27 f. and (37a) pp. 156 ff. and 160 ff.

the senses." [70] In reality, what we think and desire is the combined result of the organization of our brain and the impressions from outside. Mere sense perceptions cannot even account for our intellectual acts. In the second place, Destutt de Tracy, according to Gall, had not grasped the true elementary qualities of our intellect. To say that memory, judgment and will were modifications of feeling was to deal in abstractions. These modifications were but attributes common to all primary qualities and functions. The task for the physiologist was to find the latter.[71] Gall did not dislodge sensation from its place, but he declared it a kind of common factor which, once admitted, could be neglected. Instead, he concentrated on the discovery and explanation of the different forms of sensation, i. e. the 27 primary qualities and faculties and their cerebral organs. In doing so, he had shifted from an introspective and psychological analysis to a descriptive and physiological investigation.[71a]

Destutt de Tracy had declared ideology a part of zoology.[72] But his analysis of sensation was based on an attempted insight into the working of his mind and, therefore, quite different from the method a zoologist would use in studying the behavior of animals. This latter method was, however, the one followed by Gall, who observed animals and his fellow men, compared their various instincts, talents and deficiencies and tried to locate them in the brain. He, therefore, came much nearer to the physiological ideal of the idéologues than they themselves had done.

This was soon to be made manifest by the historical development. During Gall's lifetime, the ideological school steadily declined. Towards the end of the empire, and ever increasingly in the subsequent years, the philosophical opposition against the idéologie gathered momentum. First the Scottish philosophers of the " common sense "

[70] Gall-Spurzheim (44) vol. 1, p. 107. The passage ". . . l'éducation dont le but doit être de faire ce que l'on désire des individus et des nations" is particularly interesting. Such an idea of the aim of education harmonized very well with the concept of education as a process of " conditioning."

[71] *Ibid.*, vol. 4, p. 227 f. Blondel (6) p. 83 ff. and Delaunay (31) p. 1241 ff. have rightly stressed Gall's opposition to the sensualists. It has to be added that this opposition extended to their social and political ideas as well.

[71a] *Cf.* Blondel (6) p. 117 f.

[72] *Cf.* Temkin (119) p. 13.

school were introduced,[73] then the Germans, Kant, Fichte and Schelling, were studied with increased interest, and Plato and Descartes with his dichotomy of body and soul again attracted attention. A new school of "eclectics" or "psychologists" came to the fore and by 1830 under the leadership of Victor Cousin and Théodore Jouffroy it had become "the official philosophy."[74] Introspective psychology as the science of the mind and as a stepping stone to metaphysics was one of the main features of this new school. Whatever the vicissitudes of its doctrines may have been otherwise, "Sensualism" was charged with materialism, atheism and "revolutionary violence and servility."[75]

The idéologues proved rather helpless. The inherent contradiction of their system, i. e. their failure to give a satisfactory physiological interpretation of the vast world of ideas, was bound to lead to a split. The choice lay between psychology and physiology. Maine de Biran (1766-1824), once the bright hope of Cabanis and Destutt de Tracy,[76] had taken the road in the first direction. Physiologists like Magendie, who had been reared in the teachings of the idéologues, put their trust in empiricism, growing increasingly disdainful of all theories. Thus the field seemed to be clear for eclecticism when in 1828 Broussais' book *De l'irritation et de la folie* appeared, which carried a blistering attack against the "Kanto-Platonists," "psychologists" and "spiritualists." These men, Broussais said indignantly, were trying to do away with the philosophical achievements of Bichat, Cabanis, Destutt de Tracy, Pinel and others who had followed the path of objective science. Instead, they tried to impose the foreign concept of man as an intellectual and moral entity which was to be studied by the science of the consciousness. This was a dangerous and impossible undertaking. The phenomena of con-

[73] Lélut (66) p. 360 ff. pointed out the parallels between the Scottish school and phrenology. Combe (22) in the preface to his *Constitution of Man* referred to Hutcheson, Adam Smith, Reid, Stewart and Thomas Brown. In this connection I regret that the book by Garnier, *De la phrénologie et de la psychologie comparées*, 1839, which is quoted by Lévy-Bruhl (68) p. 206 was not available to me; nor could I consult F. Dubois *Examen des doctrines de Cabanis, Gall et Broussais*, Paris, 1842 which is mentioned by Peisse in Cabanis (18) p. lvi, footnote.

[74] Boas (6a) p. 251.

[75] *Ibid.*, p. 119.

[76] *Cf.* Picavet (90) p. 477.

sciousness are not sufficient to constitute a science. The words *reason, ego, consciousness* " merely express results of the action of the nervous matter of the brain, an action which is susceptible of change as long as the state of life lasts." [77] *Irritability*, defined as the property of living tissues " to move upon the contact with a foreign body," is at the bottom of all this. " When man has the consciousness of the movements excited by the foreign bodies . . . one says that he has felt the impression of these bodies and one gives the name of sensibility to the faculty which he has of feeling them. Thus sensibility belongs to the *ego* and irritability belongs to all the fibres of man's body. A part affected by the foreign bodies may experience movements without the *ego* being conscious thereof. In this case there is irritability only. If, however, the *ego* experiences a modification which makes man say *I feel*, there is irritability and sensibility. Sensibility, therefore, is the consequence of irritability, whereas irritability is not the consequence of sensibility. . . ." [78] The inner world of consciousness exists, but since it is dependent on external conditions it cannot be made an independent science. Broussais knows that he is unable to explain how thought is produced by an irritated nervous system. But this is no reason for substituting a hypothetical entity as the spiritualists do. The whole difference between physiologists and spiritualists can be summed up as follows: " We have proved by the facts that all the instinctive and intellectual phenomena are acts of the irritability of the nervous system, but we have refused to explain the how. We essentially distinguish the fact of the production of thought by the brain from the explanation of this fact, whereas the spiritualists deduce the impossibility of the fact itself from the impossibility of its explanation and place an entity in the brain in order to supply this explanation. We reply that this entity is a hypothesis." [79]

The book made a great stir and caught the eye of friend and foe. It is said to have earned Broussais his seat in the " Institut," [80] in the section of philosophy, a successor to the " section d'analyse " which the idéologues had once dominated.[81] The eclectics on their

[77] Broussais (14) p. 490.
[78] *Ibid.*, pp. 2-3.
[79] *Ibid.*, p. 543, footnote.
[80] *Cf. Saucerotte* (102) col. 535.
[81] *Cf.* Peisse in Cabanis (18) p. 62, footnote.

part also acknowledged the importance of this book, Damiron devoting a large chapter to Broussais as one of the representatives of the sensualist school. Broussais tried to vindicate Cabanis and his circle even including his old antagonist Pinel. He had attacked Pinel because the latter with his "essential fevers" and his classificatory system of diseases had represented ontology in medicine. Pinel had considered diseases as autonomous entities; Broussais conceived them as mere results of abnormal irritation of tissues. These differences had been medical. Now, before the threat of spiritualism, Broussais felt himself philosophically united even with Pinel.[82] But his uncompromising attack against the new metaphysical ontology did not solve the difficulty inherent in ideology. The criticism was negative; he had no positive doctrine to oppose to introspective psychology. Yet, as a matter of fact, such a doctrine existed in Gall's system, it was but necessary to accept it. Sometime after 1828 Broussais actually made this step and became an enthusiastic phrenologist.

It is not without interest to observe Broussais' changing attitude towards Gall. In 1821 Broussais was still critical of Gall, making light of the idea that passions and instincts, just as intellectual faculties, had their center in the brain.[83] In *De l'irritation et de la folie* of 1828, Broussais' tone has changed. Gall has acquired "eternal rights to the gratitude of men" by his great work on the functions of the brain.[84] "The foundations of his system are very solid; we regard him as one of those who have best understood the functions of the nervous system and we are indignant at the levity and ingratitude with which writers have treated him who have hardly left the ranks of his hearers and who owe him anything reasonable they have said about the functions of the brain."[85] Nor does Broussais find any fault with the fundament of Gall's doctrine "which consists in referring all intellectual and instinctive phenomena to

[82] Broussais (14) p. xii.

[83] Broussais (16) t. 2, p. 389: "M. le professeur Richerand se range du côté de Cabanis pour rapporter aux viscères les déterminations instinctives; et la vérité de ce fait ne parait plus aujourd'hui contestée que par m. le docteur Gall."

[84] Broussais (14) p. 426.

[85] *Ibid.*, p. 478.

the action of "the encephalic apparatus." [86] Nevertheless he cannot yet follow him in his organologic system.[87] But by 1836 the conversion is complete; Broussais delivers a course of lectures on phrenology which is attended by such a large audience that a new hall has to be found. At the very outset Broussais insists that phrenology is not a psychological system but " the physiology of the brain." [88] Gall has felt that observation of oneself is not sufficient and that it is necessary to study others. Introspection reveals man in certain situations only, whereas observation of others reveals man in a much broader light. " What follows from this? that the study of man is an observation of natural history and that then psychology is no more than a branch of it, no more than the history of some of the circumstances in which man may find himself." [89]

Broussais' deviations from Gall can here be neglected. What matters is to show that his final acceptance of phrenology represented a logical historical development, i. e. logical from the point of view of his physiological premises.[90]

But as far as Broussais personally was concerned it seems that logic was helped by a human agent, the philosopher Auguste Comte. When Comte, in 1854, published the fourth and last volume of his *System of Positive Polity*, he added an appendix containing his early essays. The last of these essays, originally printed in the *Journal de Paris* of August 1828, and now reprinted, was a review of Broussais' *De l'irritation et de la folie*. Commenting on this essay, Comte now said: " The insight gained through my personal experience was utilised in this review of the memorable work in which Broussais worthily combated the metaphysical influence. This concluding Essay will ever possess an historical interest since it roused

[86] *Ibid.*, p. 479.

[87] *Ibid.*, p. 468 ff. A somewhat similar appreciation already occurs in Broussais (16[a]) p. 68 ff.

[88] Broussais (13a) p. 2.

[89] *Ibid.*, p. 86.

[90] This has to be pointed out in view of the accusation that Broussais became a phrenologist to give new impetus to his waning popularity, *cf.* Huet (55) p. 44 f. Casimir Broussais (15) vol. 1, p. xiii was quite right when he stressed the unity of his father's work including the phrenological phase. Similarly Lélut (67) p. 225 f. although highly critical of phrenology.

the great biologist to the noble effort which produced, at the close of his admirable career, his just appreciation of the masterly conception of Gall, till then disregarded by him." [91]

Whether Comte really converted Broussais to phrenology or whether he merely flattered himself of having exerted this influence, so much at any rate is certain: to Comte's mind, phrenology was the culminating point in the positive study of man as a natural being. As early as 1825, with clear reference to phrenology, he had said: "All who are truly on a level with their age, are aware that physiologists, in our day, study moral phenomena exactly in the same spirit as other phenomena of animal life." [92] In his review of Broussais' book he had been more explicit. Following the other sciences, physiology had taken the turn toward positivism in the second half of the 18th century. But to make the development complete the intellectual and moral phenomena also had to be included. "Thus the memoirs published at the beginning of this century by Cabanis on the connection between the physical and moral nature, are the first great and direct effort to bring within the domain of positive physiology this study previously abandoned entirely to the theological and metaphysical methods. The impulse imparted to the human mind by these memorable investigations has not fallen off. The labours of M. Gall and his school have singularly strengthened it, and, especially, have impressed on this new and final portion of physiology a high degree of precision by supplying a definite basis of discussion and investigation." [93] Needless to say that Comte praises Broussais for his fearless attack upon the psychologists and for having shown the futility of introspective analysis. But Broussais has not gone far enough, and Comte blames him for not having "proved that such internal observation is necessarily impossible." [94] Comte makes this impossibility clear on the basis of a phrenological argument: the

[91] Comte (28) vol. 4, pp. iii-iv. My attention was drawn to this review by v. Hayek's (50) article.

[92] *Ibid.*, p. 598. Possibly here as in his general biological views Comte had been influenced by de Blainville. The latter in 1821 was reported as upholding phrenology [*cf.* Capen in Spurzheim (113) p. 59 f. and Delaunay (31) p. 1279] although in his (5) *Cours*, vol. 2, pp. 369 and 408, he expressed himself very cautiously.

[93] Comte (28) vol. 4, p. 645. [94] *Ibid.*, p. 647.

observing organ cannot observe itself directly. Another point on which Broussais is blamed concerns his failure to make clear " the immense difference which exists between the physiological doctrine of man, intellectual and moral, and the theories of the metaphysicians of the last century, who saw in our intelligence only the action of the external senses, disregarding every predisposition of the internal cerebral organs." [95] He particularly refers to Condillac and Helvetius, both of whom Gall had attacked. In his *Cours de philosophie positive* Comte also includes Destutt de Tracy who had declared ideology a part of zoology, only to treat it right away as an independent and primary science.[96] Gall and Spurzheim, he says here, have refuted " the puerile reveries of Condillac and his successors on the *transformed sensation*." [97] Unlike Broussais, Comte had not graduated from the sensualist school. An erstwhile collaborator of Saint-Simon, and a sociologist rather than a physiologist, Comte was able to view the idéologie much more objectively and to see that Gall's criticism of sensualism and ideology was justifiable on the basis of the latter's own premises.

Phrenology played a very important rôle in Comte's system [98] as evidenced by the position he assigned to it in his *Cours de philosophie positive*. It forms the subject of the 45th lesson which he wrote in December 1837 and which is entitled: " Considérations générales sur l'étude positive des fonctions intellectuelles et morales, ou cérébrales." [99] Here Comte proves himself by no means a blind follower of Gall. On the contrary, he very clearly sees the many shortcomings of the doctrine, and emphasizes his concern with its basic concepts rather than its details.[100] The basic concept he regards as correct and as constituting one of the principal elements of the philosophy of the 19th century.[101] As to the details, particularly Gall's table of primary functions and the way he localized their organs, he contends that it was better to establish a hypothesis that could afterwards be

[95] *Ibid.*, p. 648.
[96] Comte (25) vol. 3, p. 541.
[97] *Ibid.*, p. 550.
[98] In this connection *cf.* particularly Boas (6a) and Lévy-Bruhl (68) p. 188 ff.
[99] Comte (25) vol. 3, p. 530.
[100] *Ibid.*, pp. 567, 585 ff. [101] *Ibid.*, pp. 586-87.

verified than to refrain from giving the system a form of completeness necessary for its propagation.[102] This was essentially the same stand as taken by him regarding Broussais' reform of pathology. Broussais had conceived of disease " as essentially consisting in the excess or deficiency of stimulation of the different tissues, either rising above or falling below the degree which constitutes the normal condition. This conception throws a great light on the nature of diseases, by exhibiting them as results of mere changes of intensity in the action of stimulants indispensable for maintaining health." [103] If Broussais had " erred as to the real seat of a particular malady, it was better for pathology, and even for therapeutics, to propose a seat at variance with the true one than none. M. Broussais has thus definitely led thinkers to the true road of observation, where, even while combating his ideas, they can only serve the progress of science." [104]

Thomas Huxley once expressed astonishment at Comte's lack of comprehension of the main features of science, " his strange mistakes as to the merits of his scientific contemporaries; and his ludicrously erroneous notions about the part which some of the scientific doctrines current in his time were destined to play in the future." [105] Huxley certainly included Gall and phrenology in this statement.[106] But the example of Broussais shows that Comte was not as shortsighted as Huxley would have him. In Broussais' work Comte anticipated something of Virchow's famous definition of disease as life under changed circumstances. Broussais' mistakes, he felt, since they concerned questions of fact, could be left to verification. And the same was true of his attitude towards Gall. Where else but in Gall's system could he have found support for a complete positive system of science and for his " behavioristic " concept of man [107] so important for his political outlook? [108] How keen Comte's sight was is attested by Flourens who combated phrenology lest Gall's philoso-

[102] *Ibid.*, p. 567 ff.
[103] Comte (28) vol. 4, p. 650.
[104] *Ibid.*, cf. also Lewes (69) p. 407 f.
[105] Huxley (57) p. 149.
[106] *Cf. ibid.*, p. 154 f.
[107] Boas (6a) p. 284.
[108] *Cf.* v. Hayek (50).

phy might become that of the 19th century.[109] For Comte, the Positivist, and Flourens, the "psychologist,"[110] interpreted Gall alike though they evaluated him quite differently. And in 1877 Ferraz could sum up the situation by saying that Gall and Broussais had formed the link between "condillacisme" and "comtisme" which latter, as Ferraz stated, "had assumed such great authority under the second [empire] and which at this moment pretends to universal domination."[111] Indeed it can be said that even today Gall is largely seen through the glasses of his positivistic interpreters. Emile Littré in France and George H. Lewes in England who were both strongly influenced by Comte, though they refused to accept all the tenets of strict Positivism, defended Gall's reputation at a time which was fast forgetting its indebtedness to the man over the laughter at his fantastic claims. Broadly speaking, Littré and Lewes agreed that phrenology was dead and that Gall's scheme of specific functions and cerebral organs had not survived the test,[112] but that he had led the right way in assigning the study of mental functions to biology[113] and in posing the problem of cerebral localization.[114] "Indeed all that relates to the general propositions respecting a plurality of functions, and a plurality of organs, Gall must be admitted to have triumphantly established. It is only in the details that he is unsuccessful."[115] Thus they moulded the picture of Gall as a great, though misguided, and perhaps even slightly ridiculous, figure in the rise of a progressive science.

[109] Flourens (39) p. xiii: "The seventeenth century recovered from the philosophy of Descartes; the eighteenth recovered from that of Locke and Condillac: is the nineteenth to recover from that of Gall?"

[110] In his controversy against phrenology, Flourens appears as the physiologist of the "eclectic" school; a possibility which I intend to investigate on a broader basis.

[111] Ferraz (37) p. 308.

[112] Lewes (69) p. 421 ff., Littré (72) p. 541 f.

[113] Lewes (69) p. 408, Littré (72) p. 542. *Cf.* also, among moderns, Boring (9) p. 55.

[114] Littré (72) p. 545.

[115] Lewes (69) p. 421. For Positivism as a transmitter of phrenological ideas *cf.* also Delaunay (31) p. 1284.

Religion and Politics

a.

In the preceding part the naturalistic element of Gall's system has been presented and it has been shown how this element entered into the positivistic movement, especially of France. The presentation emphasized those features which are mostly remembered today. The picture drawn is true enough as far as it goes, but it is not complete, it does not portray the historical Gall. The positivist Gall has to be complemented by the metaphysician Gall who had his roots in a tradition different from the revolutionary sensualism of the late 18th century.[115a]

Gall has rightly been called a deist.[116] "To be an atheist and, moreover, even to profess it, has always seemed absurd to me." [117] On the other hand, he was rather indifferent to dogmas and creeds and not above occasional cynical remarks in religious matters.[118] Although admitting that the soul of man was one and the same and the brain but the material basis for the exercise of the mental faculties,[119] he shunned discussions on the immortality of the soul "because this does not concern the physiologist directly." [120] Obviously, Gall was not a pious person in the orthodox sense.

Now it may well be asked why Gall who pretended to avoid religious questions not pertaining to physiology did not follow the same policy with regard to man's creation and destiny. Yet, far from avoiding the problem of creation, he repeatedly dwelled upon it and even offered a proof for God's existence based on the organ of religious sentiment.[121] The answer to the question is that at Gall's time, and especially outside of France, physiology had not yet severed all ties with natural theology. Physiologists not only used teleological

[115a] I am of course aware that the distinction between positivism and metaphysics is a matter of convenience rather than of substance. In particular I agree with Riese (97) p. 121 f. that Gall's "faculties" have a metaphysical basis.

[116] Neuburger (84) p. 65.

[117] *Ibid.*, p. 35.

[118] *Ibid.*, p. 30 and Neuburger (83) p. 100.

[119] Gall-Spurzheim (44) vol. 2, p. 60 f.

[120] Neuburger (84) p. 35.

[121] Gall-Spurzheim (44) vol. 4, p. 190 f.

expressions (as they still do today), but attributed the seeming purposefulness of organic structure to design on the part of God. Indeed, from Galen's *On the Use of Parts* down to the Bridgewater treatises [122] many physiologists believed that their science helped to prove the existence of God and a wise Providence. Gall clearly belonged to these men, and sometimes expressed himself in an enthusiastic vein reminiscent of Galen.[123]

But Gall is not primarily intent on proving design. Rather he takes design for granted. He remembers his school days, when his teachers often spoke of "natural gifts, of God's gifts," and admonished him and his fellow students "in the spirit of the Gospel, telling us that each of us would have to render an account in proportion to the talents he had received." [124] The conviction of the divine and immutable order of the physical as well as moral world goes like a *Leitmotiv* through his philosophy and serves as a justification for his basic principle that man's qualities and faculties are inborn.[124a]

According to Gall it is wrong to assume, as the ideologists had done, that external needs shape animals and man. On the contrary, the needs come from inside as the result of the action of the cerebral organs. Therefore, Lamarck is mistaken in believing that needs and usage moulded organs or brought new ones into existence.[125] What is true in the realm of biology, holds equally true in the social world. It is a mere dream to imagine some natural state of man to which good and bad qualities have been added by his social life. Some animals live in isolation, others in community. "Man has been destined to live in common. Nowhere and at no time has he lived isolated. As far as one can go back in history, he has been united in families, hordes, tribes, peoples and nations; consequently, his qualities also had to be calculated for society. The phenomena one observes in whole peoples are no more the effect of this union than

[122] *Cf.* the article by Spector (107).

[123] *Cf. e. g.* Gall-Spurzheim (44) vol. 4, p. 259 f. Gall (42a) p. 130 quotes Galen with approval.

[124] *Ibid.*, vol. 1, p. iv.

[124a] *Cf.* below, Appendix.

[125] Gall-Spurzheim (44) vol. 2, p. 37. *Cf.* Blondel (6) p. 64 f.

are the phenomena which take place in each man in particular. Always and everywhere has the human species manifested the same penchants and the same talents; always and everywhere this has led to the same virtues and the same vices, the same industries and the same institutions. . . . The only changes which one notices in the progress of human society consist in that the same penchants and the same faculties are exercised upon different objects and produce modified results. The morals, customs, laws and different religious ceremonies of the different peoples rest upon the same bases. . . . Sing your love upon the reed-pipe or the harp, adorn your chiefs with feathers or the purple and your women with flowers or diamonds, live in huts or in palaces—it is always the same faculties that make man act in the circle which his Creator has drawn for him." [126]

The significance of this stands out most clearly in its consequences which put Gall in contrast to "progressive" thought of his time. His attitude is thoroughly unhistorical. French physiologists like Bichat and Magendie had carefully evaluated the relative shares of natural endowment and civilized life in man's higher faculties. Of course Gall did not deny the influences of cultural life or of education. But these influences can only develop or suppress, they can neither create nor abolish what is inherent in man. "Thus all the allegedly factitious qualities and faculties are the original appendage of the human species and not the subsequent effects of invention and of discoveries. It is in the disposition of men without culture, in the disposition of savages and barbarians, that one must study the natural dispositions of the civilized nations." [127] In other words, the study of the primitives reveals man as he really is, it is anthropology in the true sense of the word. And the primitive in man always remains alive: "Study the penchants and faculties of civilized men and you will recognize the penchants and faculties of the savages and barbarians." [128]

The slogan of "human nature never changes" even today is often favored by the biologist sceptical of social utopias where man will

[126] Gall (43) vol. 1, pp. 173-175 (contracted).
[127] Gall-Spurzheim (44) vol. 4, p. 251 f.
[128] *Ibid.*, p. 252.

be peaceful, good and wise. This scepticism has a radical protagonist in Gall who denies an ever-progressing perfection of mankind. " For the whole known duration of the human race, the generality of men has always been subjected to ignorance, error, prejudice and superstition. Slavery, brutality, the loud and gross gratifications of the senses have always been its share." [128a] Hunters, fishermen, peasants execute everything mechanically and are hostile to all innovations. Craftsmen behave very similarly, and in the " higher classes " things are not so very different either. The rulers could exercise an enormous influence upon the arts and sciences and they know that by encouraging talent and industry they gain fame and the blessing of future centuries. But they succumb to the immensity of their task, to the tyranny of etiquette and the jealousy and ignorance of their favorites. The idle rich squander their lives in the pursuit of idle honors and sensual pleasures. " Hence the sad truth that the class of men who from their imaginary height, look with contempt upon the populace is nevertheless on the same level as the latter as far as their lights are concerned." [129] Philosophers fall into extravagant errors, not to speak of the interminable controversies of theologians, the eternally vacillating forms of government, and the infantile state of criminal legislation. Have poetry and the fine arts progressed? A look at the monumental buildings of the ancients and at the artistic and poetical works of past ages will be convincing argument against an ever-progressing perfection. " Whatever man can attain immediately through the energy of his faculties and qualities, all that is in the province of genius, he has attained and will attain whenever the development of his organs has been or will be favored to a very high degree by nature." [130] The positive arts and sciences seem to form an exception. Favored by particular circumstances they can advance far beyond their initial state. But even they do not contribute to the moral or intellectual perfection of man. New knowledge is acquired at the expense of the old. Even if the mass of society is enriched by countless new discoveries, the individuals do not thereby become more impressive. Everybody has to restrict himself to a particular field so as to keep abreast. " And no sooner has one started

[128a] *Ibid.*, p. 252. *Cf.* Soury (106) p. 510.
[129] *Ibid.*, p. 253. [130] *Ibid.*, p. 254.

to soar to the height of one's domain than one is thrown into the abyss of nothingness." [131] The same is true of nations; Athens and Rome have fallen back into barbarism and barbarians, on the other hand, have shown all the political virtues and vices to be found in the most modern states. In short, the history of all nations is the same and " the moral perfectibility of the human species is confined within the limits of its organization." [132]

From a moral point of view, the human race is neither good nor bad but both. Man is endowed with benevolence, religious feelings and other good qualities. But he will also steal and murder, and there will always be wars,[133] since all these acts are founded in his natural desires. And since God has created man, one must recognize the existence of moral as well as physical ills as entering into " the plan of eternal Providence " and must submit for the one as for the other " to the decrees of God." [134]

Gall's metaphysical concept implies a strict harmony between moral and physical laws. Both have their source in God and there can be no discrepancy between the two. Gall was only consistent when he said: " All man does, all he knows, all he can do and all he can learn, he owes to the author of his organization. God is the source thereof; the cerebral organs are the intermediate instruments which He uses." [135] Driving this view to its very extreme, he exclaims enthusiastically: " God and the brain, nothing but God and the brain! " [136]

Gall was subtle enough to see that this doctrine might easily lead to a fatalistic philosophy. In his own way he was faced with the age-old dilemma between the concept of an ordered universe and man's urge to see meaning in his actions. The theological antinomy between God's will and the moral liberty of His creature, the dialectician's difficulty of reconciling the historical process with the

[131] *Ibid.*, p. 255.
[132] *Ibid.*, p. 256.
[133] On November 18, 1805, in the midst of the Napoleonic wars, Gall wrote: " Ach wie vieler Menschen Glück stört das unselige Kriegen! und doch liegts, wie es meine Lehre zeigt, im Plane der Schöpfung." Neuburger (84) p. 14; *cf. ibid.*, p. 59, note 10.
[134] Gall-Spurzheim (44) vol. 2, p. 65. *Cf.* below Appendix.
[135] *Ibid.*, vol. 4, p. 247. [136] *Ibid.*, p. 260.

desire to play an active historical rôle, the scientific contradiction between man as a mere particle of nature and man as the ruler over nature are but different aspects of the same dilemma. By assuming the existence of inborn evil tendencies in man Gall tried to solve the dilemma. Without the inclination towards evil there would be neither vice nor virtue and man's actions would be subject to neither praise nor blame. Here Gall's arguments are full of quotations from the Gospel and the Fathers of the Church, and indeed what Gall defends is the doctrine of original sin.[137]

The whole peculiar combination of science and theology as sketched in the above pages was irreconcilable with the creed of French liberals and Comtists. Comte himself rejected Gall's historical speculations by the same argument he had used against Cabanis who had " confounded the study of individual man with that of the human race collectively regarded." The latter is the domain of sociology which, though based on physiology, is yet a separate science " requiring special observations on the history of the development of human society, and special methods." [138] And Gall's theological views he simply ignored.[139] The liberals, as represented by Broussais, likewise tried to evade Gall's theological preoccupation by suggesting that the latter's proof of the existence of God might have been motivated by convenience rather than belief.[140]

The French liberals were indeed in a difficult position. Phrenology was not only the climax of the idéologie, it was also a leaven of anticlericalism. At a time when Xavier de Maistre interpreted disease as an expression of sin,[141] the phrenological fashion of the day interpreted crime as a disease, and deplored great criminals as victims of their organization.[142] Thus in the words of Damiron, " Some have

[137] *Ibid.*, vol. 2, p. 66: " C'est ainsi que, pour le mal moral, le genre humain porte sur le front l'empreinte du mal originel."

[138] Comte (28) vol. 4, p. 648.

[139] In the face of Comte's attitude, Blondel (6) pp. 125 and 153 rightly insists on the sincerity of Gall's belief in God.

[140] Broussais (13a) p. 340.

[141] De Maistre (74) vol. 1, p. 46 ff.

[142] *Cf.* Flourens (37a) p. 124 where he also refers to Chateaubriand; it is characteristic that the latter had no use for Gall, *cf.* Chateaubriand (20) t. 2, p. 302 f. *Cf.* also above, p. 288 and Delaunay (31) p. 1284.

seen in this system an antimystical, antitheological and antisacerdotal idea and have then elevated and defended it like a flag, they have vowed to keep its memory bright; others on their side have seen in it an impious and immoral doctrine which they have treated with violence and covered with maledictions." [143] Even after the phrenological system and Gall's work had been pushed into the background, the idea of cerebral localization was upheld as a liberal dogma, and in the 'sixties the discussions about the speech center were strongly tinged by materialistic and republican sentiments.[144] It has to be said that Gall deeply believed in the search for truth as the noblest task of the scientist, and deplored any obstacles put in the path of scientific research. It can also be admitted that Gall was more interested in the truth of his doctrine than in any theological or political consequences it might have. "My doctrine can exist side by side with any religion and any constitution." [145] But Gall was certainly not an antireligious person nor a democrat in politics. Characteristically enough, one of his main patrons was Prince Metternich,[146] and his medical practice in Paris extended amongst the most aristocratic circles, notably the members of the diplomatic corps.[147] Moreover, Gall's political indifference and theological metaphysics were supplemented by opinions where belief in the inequality of man mingled with downright contempt for the majority of men. "The study of the physiology of the brain shows us the limits and the extent of the moral and intellectual domain of man. It shows us an immense disproportion between the mediocre faculties and the eminent faculties, and it leads us to the conclusion that wherever regulations, decisions and laws are the work of the majority of votes, mediocrity triumphs over genius. *Propter peccata terrae, multi principes ejus.*" [148]

Of course, the whole system of cranioscopy rested upon the principle that men were born unequal as to their moral and intellectual

[143] Damiron (30) vol. 1, p. 190, footnote. According to Delaunay (31) p. 1279 the French Société phrénologique was founded in 1831 under liberal auspices.
[144] Marie (75) p. 570. *Cf.* Riese (97) p. 110 and Rolleston (101) p. 1260.
[145] Neuburger (84) p. 37.
[146] *Ibid.*, p. 63, note 48.
[147] *Cf.* Fossati (41) col. 280.
[148] Gall (43) vol. 2, p. 50; *cf.* Soury (106) p. 511.

faculties. But Gall developed this principle in a very extreme direction. The great majority, he held, was formed everywhere by mediocre men who by themselves invented nothing and created nothing. Only those with eminently developed organs that transmitted their inner stamp to the external world, were really creative.[149] Against Helvetius Gall denied that every well-organized person could equal the very great.[150] The " greatness of the human race " was altogether a futile dream,[151] and Aristotle was right that some men were born to dominate, others to obey.[152] Certainly this was not the creed of a democrat or liberal. Fundamentally this was the attitude of a man who did not wish to upset the providential order of things, but looked upon his fellowmen with slightly cynical benevolence and the conviction that in his science he had found an instrument by which they could be administered rationally as well as effectively.

b.

In the Anglo-Saxon countries not less than in France phrenology in the early 19th century was part of the " free-thought " movement and regarded with suspicion by the churches.[153] But in contrast to France, free thought here was allied with a deism which took itself seriously rather than with atheism or religious indifference.[154] Thus it came that in the Anglo-Saxon world, Gall's metaphysical and religious speculations were no hinderance to the popularization of his system in liberal circles. It only needed a person who would give greater emphasis and a slightly different direction to this side of

[149] Gall-Spurzheim (44) vol. 4, p. 248.

[150] *Ibid.*, vol. 2, p. 40.

[151] Speaking of the criminal whose acts correspond with his inclinations, Gall-Spurzheim (44) vol. 2, p. 102 write: " Ce côté de l'homme dépravé pourra bien déplaire à plusieurs de ces hommes qui ne rêvent que les grandeurs de l'espèce humaine." Similarly, *ibid.*, p. 100 the authors say that mere punishment does not improve malefactors but add: " D'un autre côté, de prétendus philosophes ont imaginé toutes sortes de rêveries sur les droits de l'homme " etc.

[152] *Ibid.*, p. 32: " Ces exemples prouvent encore la justesse du principe qu' Aristote. . . . a posé comme formant la base de toute la science politique; savoir que, dans ce monde, les uns sont nés pour dominer, et les autres pour obéir."

[153] *Cf.* Post (91) especially p. 229.

[154] *Cf.* Barclay (2) p. 380 f.

phrenology, and this person was Spurzheim, the erstwhile student of theology. Spurzheim criticized Gall for having confused primary faculties on the one hand, and character and action on the other. As an empiricist, Gall started out with what he could observe directly, and so he believed in the existence of poetical, religious, metaphysical faculties and others of this kind which were manifestations of primary faculties in certain persons, but not the faculties themselves.[155] Besides, Spurzheim distinguished between affective faculties (comprising penchants and sentiments) and intellectual faculties (comprising external senses, perceptive and reflective faculties) which he arranged in the systematic order of a botanist or zoologist. Spurzheim's scheme, which increased the total number of faculties to 35, became more popular than Gall's classification. But the most important feature of Spurzheim's revision—in the present connection at least—was the omission of any "evil" faculty. In deliberate contrast to Gall, Spurzheim maintained that "all faculties in themselves were good and given for a salutary end," and that by abuse only could the functions resulting from them become evil.[156] Thus Spurzheim softened Gall's pessimism; if all men had been created potentially good, then there was no need to despair of the progress of mankind. Whereas in Gall's system the benefit which phrenology promised to confer was limited by the providential existence of evil, Spurzheim again could hope for the *perfection* of mankind.[157]

To Spurzheim, science, religion and morality became one. Phrenology was the science which revealed the laws of man as an intelligent and moral being. To obey these laws was to serve the will of the Creator as well as to improve humanity.[158] In the words of Charles Follen (1796-1840): "The great aim of all his inquiries into human nature, was to search out the will of God in the creation of man. Obedience to his laws he considered as the highest wisdom, and most expansive freedom."[159]

[155] Spurzheim (112) pp. 123 and 315.

[156] *Ibid.*, p. 340 f. Delaunay (31) p. 1248 f. quite unnecessarily attributes this change to Spurzheim's "prudence."

[157] Spurzheim (112) p. 356 f.

[158] *Cf.* Spurzheim's preface to his "Catechism" as reprinted in Capen (19) p. 241.

[159] Capen's biography of Spurzheim (113) p. 145.

Small wonder that Gall complained of Spurzheim that he had "too frequently deviated from the pure path of observation and had thrown himself into ideal-metaphysical and even theological reveries." [160] The fact remains that it was Spurzheim who made phrenology popular in Great Britain and the United States [161] and who influenced George Combe, the most devoted and most influential of the phrenologists. This remarkable Scottish lawyer, who was born in Edinburgh in 1788, had spent a difficult youth, suffering from illness and overshadowed by the gloom of a strict doctrine of predestination. "Some persons were elected to everlasting enjoyment in heaven; many more passed over by God's decree, before they were born, to everlasting torments in hell. I included myself at once in this category; for the doctrine of Christ's having suffered for *my* sins and purchased my redemption, appeared inconsistent, first with a pre-existing irreversible decree and, secondly, with benevolence and justice." [162] In 1815, Combe was converted to phrenology after he had witnessed Spurzheim dissect a brain. By that time he had become beset with doubts about the orthodox tenets of Calvinism, had studied the works of the Scottish philosophers [163] and had thought of writing "some useful book on human nature, and especially on the education and intellectual state of the middle ranks of society." [164] Such a book on human nature Combe eventually did write, the *Essay on the Constitution of Man and its Relations to External Objects*, which first appeared in June 1828 and became the most famous of his many publications. By October 1838, more than seventy thousand copies of this work had been sold in numerous editions in Great Britain as well as the United States.[165] The book is an application of the doctrine that man has been created in harmony with the world in which he has to live. He is subject to physical and organic laws and endowed with animal, moral and intellectual powers specified by phrenology. Moral sentiments and intellect if "illuminated by knowl-

[160] Neuburger (84) p. 44 f.

[161] *Cf.* Lélut (67) p. 217. According to Fossati (41) col. 281, Gall's journey to London in 1823 proved disappointing.

[162] Gibbon (47) vol. 1, p. 39.

[163] *Ibid.*, p. 92.

[164] *Ibid.*, p. 73.

[165] *Cf. ibid.*, p. 262, footnote.

edge of science and of moral and of religious duty" [166] are supreme over the others, for they enable man to know the laws of nature (including himself) and to live accordingly. The evils afflicting mankind are not inherent in a defective constitution, but due to the infringement of natural laws through ignorance or disobedience. Of course, phrenology as the science of the mind held a key position in this whole structure. But Combe himself put the main emphasis on man's subjection to natural laws rather than on phrenology as a particular doctrine. "We are physical, organic, and moral beings, acting under the sanction of general laws, let the merits of Phrenology be what they may." [167] It was in the relationship of man to these immutable laws that Combe found satisfaction for his religious feelings and an escape from predetermined damnation which he had vainly sought in his youth. In a letter to Dr. Channing, among other things he defined as the proper object of religion "to embrace within its circuit every interest of man, to direct the mind to the divine origin in the institution of the human being and external nature, to the legitimate use of man's functions as being the true will of God, to every abuse of these as being transgressions of that will; and to God as being in all instances a kind Creator, a benign Father, and an all-wise Ruler of the world, who instituted man that he might enjoy the felicity of his rational nature, and who exacts no service except that obedience which is man's highest advantage to give." [168]

In a delayed answer to this letter, Channing commented upon the success of the *Constitution of Man* in the United States and added: "The common remark, however, is that the book is excellent, in spite of its phrenology." [169] This remark is revealing of the rôle phrenology was destined to play. Its chief message could be formulated as: man is throughout an object of science and mankind can be improved by spreading scientific knowledge. Consequently, phrenology was a leaven in popularizing science, in furthering educational reform and in aiming at the liberalization of political and economic conditions. The triumphant welcome accorded to Spurzheim in 1832

[166] Combe (22) ch. II, sec. 4, p. 10.
[167] *Ibid.*, preface to the edition of 1828.
[168] Gibbon (47) vol. 1, p. 219 f.
[169] *Ibid.*, p. 221.

and to Combe in 1838, the latter's influence upon Horace Mann, the American educator, and his great success as a lecturer,[170] are but examples of the widespread influence of phrenology in the United States even among those who did not profess to be phrenologists.[171] In Great Britain likewise phrenology reached much further than the group of its outspoken adherents. It became, above all, a movement among what was called " the industrial classes." [172] Opposed alike to the predominance of religious teaching in the schools as well as to the concentration on classical studies, the phrenologists insisted on a widespread secular education in which science and economics should find their due place. Combe had given lectures " to the middle and working classes " from which a " Philosophical Association for procuring Instruction in Useful and Entertaining Science " resulted.[173] Another phrenologist, Mattieu Williams, himself a mechanic, was influential at the London Mechanics' Institution and in 1848 joined forces with Combe and became the principal of the Williams School in Edinburgh, a secular school which drew its pupils from the working classes.[174] Nor could it fail that phrenologists joined in the great reform movement which was then sweeping over England. Combe consistently urged improvements in the conditions of workers and denounced existing political practices of trade restriction, colonial rule, and parliamentary corruption.[175] And not by chance was Richard Cobden, the protagonist in the fight against the corn laws, a friend of Combe and himself a convinced phrenolo-

[170] *Cf.* the account of Combe's American tour as described by Gibbon (47).
[171] *Cf.* Riegel (95, 96).
[172] *Cf.* Gibbon (47) vol. 1, pp. 254 and 300.
[173] *Ibid.*, p. 289.
[174] *Ibid.*, vol. 2, p. 247 ff. Although Williams remained a phrenologist to the end it is interesting to see how with him the cranioscopic aspect became of secondary importance. In his (121) *Vindication of Phrenology*, p. 256 f. he wrote: "No phrenologist properly so called pretends to read, or delineate, or determine character by a simple examination of the head. He knows that the proportionate development of different regions of the brain is but one of the factors of character, the other being the total of the external influences that have operated on the individual. These include his life-history, his formal and his informal education; what he has been deliberately taught by parents and other avowed teachers, and the still more potent educational influences of the incidents of daily life."
[175] Combe (22) ch. III, section 3.

gist.[176] To him as to many others of his time, phrenology stood for the scientific view of man's nature [177] and this meant the power of reason against privilege, prejudice and traditionalism in education, religion, national economy, and politics.

However, English phrenologists tended towards a reformist rather than a revolutionary attitude. Laws had to be changed and democratic institutions perfected, but above all man himself had to be improved as an individual through the exercise of his moral faculties.[178] And phrenology, as Spurzheim had already emphasized,[179] taught tolerance since it showed that men had been created unequal and could, therefore, not be expected to see everything alike.

Phrenology in England was a forerunner of the much more powerful movement for the spread of scientific education and philosophy that is associated with Thomas Huxley, Tyndall and others of their generation. It was not agnostic and materialistic in the sense of many Darwinists; its tenor was rather that of the Bridgewater treatises which Combe's *Constitution of Man* actually preceded.[180] This may be one of the reasons why the problem of Design became so important in the controversies about Darwinism in England. Nor must it be forgotten that Huxley and Tyndall repeatedly addressed audiences of working men who, a generation before, had listened to the phrenologists. It would certainly be a serious mistake to overrate the breadth of the phrenological movement in England. The circle of its serious representatives remained relatively small and it numbered few physicians and scientists of repute—a serious handicap for a doctrine that claimed to march in the forefront of science. Yet in England, just as in France, a bridge led from phrenology to the science of the later 19th century. Herbert Spencer, for instance, in his early years was so deeply interested in "phrenology" that in 1846 he devised a "cephalograph for taking more exact measure-

[176] *Cf.* Gibbon (47) *passim* and Morley (80) pp. 26, 60, 78 and 128.
[177] *Cf.* Morley (80) pp. 26 and 60.
[178] Combe (22) Conclusion, p. 54 and Gibbon (47) vol. 1, p. 302.
[179] Spurzheim (112) p. 359 f.
[180] *Cf.* Gibbon (47) p. 296 where Combe is mentioned as complaining of Thomas Chalmers who in his Bridgewater treatise *On the Adaptation of External Nature to the Moral and Intellectual Constitution of Man* adopted the principles of the *Constitution of Man* without referring to it.

ments of the head.[181] Later he became "sceptical about current phrenological views,"[182] but in 1855 he wrote: "Localization of function is the law of all organization whatever: separateness of duty is universally accompanied with separateness of structure: and it would be marvellous were an exception to exist in the cerebral hemispheres."[183] This statement occurs in Spencer's *Principles of Psychology*, a work that exerted such a strong influence upon John Hughlings Jackson.[184] Again, Combe was acquainted with George Eliot who was a believer in phrenology[185] and who was so closely associated with George Lewes, the positivistic interpreter of Gall. Indeed, phrenology in France and England did not develop in complete isolation; there existed numerous connections just as there were connections between phrenology and the positivistic physiology of the late decades of the 19th century.

Of the phrenological movement the above pages have sketched two aspects, each of which assumed its own momentum, though they were united in the thought of its founder. But as it so often happens in history, the work of the man had its own fate; everybody took what he wanted regardless of the intentions of the author. It was just this existence of so many different elements that predisposed phrenology to serve many aims, even beyond those indicated, and attracted persons of divers temperament and outlook.

APPENDIX

Of Gall's *Philosophisch-medicinische Untersuchungen über Natur und Kunst im kranken und gesunden Zustande des Menschen*, only the first volume appeared. It was republished in 1800 and since I have only had this edition at my disposal, I am unable to say what may have been changed or added after 1791.

The work aims at defining the relationship between nature and its healing

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[181] Spencer (108) vol. 1, Appendix H.

[182] *Ibid.*, vol. 1, p. 540.

[183] Spencer (109) p. 606 f.

[184] *Cf.* Temkin (117) pp. 301-305.

[185] *Cf.* Cross (29) p. 78. In 1855 she wrote (*ibid.*, p. 279): "We are reading Gall's 'Anatomie et Physiologie du Cerveau,' and Carpenter's 'Comparative Physiology,' aloud in the evenings"—another remarkable example of the close association of phrenology and orthodox physiology among laymen.

power on the one hand and medical art on the other. Repeatedly Gall insists on facts as against speculation and his contempt for "metaphysicians" is already well pronounced. He presents vast casuistic material from medical and philosophical literature, a document of his erudition but also of his lack of discrimination where so-called experience is concerned. From the outset he attacks the views of Stahl and his followers who claimed that the soul was active in all vital functions. Instead, Gall maintains that God created all creatures so that through "predestined mechanisms" (cf. p. 45) of their organization there exists harmony between their needs and their abilities to satisfy them. In this respect, man holds no superiority over animals; they are all equally perfect in themselves (cf. p. 79). It is this predestined order that keeps man too in much more rigid limits than his pride and egoism would lead him to believe. "The master plan is outlined for him too. And he stands between barriers which do not seem to impede him, only because his God knew how to combine everything that was to fall into his sphere of action with his happiness and comfort." (p. 118). Yet nature can fail and diseases may arise which warrant the cautious interference of the physician. "The physical world has this in common with the moral world that evil is an inseparable consequence of that institution which is necessary for life, growth, health and preservation" (p. 251).

Where Gall dwells upon the animal nature in man he often uses parallels which are in bad taste,—e. g. he exemplifies the sphere of sexual functions by a detailed account of the behavior of dogs (cf. p. 28 ff.). If his phrenological lectures were delivered in a similar vein, the disgust felt by some of his listeners would be understandable. The question might even be raised as to whether his cynical tone did not contribute to the accusation of "crass" materialism.

Gall, in the book under discussion, does not deny the existence of the human soul or the possible influence of our notions and imaginings upon our health. But he claims that in normal life the soul is "merely a spectator of the play of the organs; she has all the single ideas and the consequences of ideas not because she wants to have them, but because the movement of the organs compels her to have them" (p. 180). Besides we "do not yet know of a place in the brain where all nerves join and which, therefore, might be a suitable residence for the soul" (p. 24). Gall defends the theory "that the various psychic faculties and notions have their seat in different places of the brain" (p. 197 f.). He connects this idea of localization with the unequal endowments of men indicated by the shape of their brains (*ibid.*) and even with criminal tendencies which occasionally may overpower an individual (p. 677 f.). If these "phrenological" passages actually occur in the first edition they must be considered highly significant for Gall's early development.

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THE EARLY HISTORY OF APHASIA

W. RIESE

Aphasia is understood to be a disorder in symbolic thought and expression (H. Head).[1] It is related to lesions of the left hemisphere in right-handed people, more specifically, to a rather extensive area surrounding the Sylvian fissure. Therefore, the early history of aphasia [2] would have to discover:

1. The first unmistakable description of speech disturbances in brain lesions, a *clinical* subject;

2. The first attempt to correlate these disturbances with a well-defined region of the brain, an *anatomical* subject;

3. The first attempt to correlate handedness with speech, a *physiological* subject.

As will be seen, it is impossible in an historical investigation of our subject to isolate these various aspects from one another.

F. J. Gall is credited with the first complete description of aphasia due to a wound of the brain; he also reported on speech disturbances due to a vascular lesion. But Gall was not the first author who gave a description of aphasia which meets roughly the requirements of clinical examination. The first description containing basic features of aphasia was made by J. W. Goethe [3] in his *Wilhelm Meister's*

[1] *Aphasia and Kindred Disorders of Speech*, Cambridge University Press, 1926. This work, real landmark of contemporary neurology, contains also the first history of aphasia; my paper intends to complete but also to correct some of Head's statements concerning the early history of aphasia.

[2] Cases of aphasia might have been known to antiquity. In his *Clinique Médicale de l'Hôtel-Dieu de Paris* (1868) Trousseau referred to Pliny. Schenkius, who lived towards the end of the sixteenth century, saw that in certain cerebral diseases the patients whose tongues were not paralyzed could not talk, "because they lost their memory." In 1820 Lordat described "*alalia*," disorder of the synergy of the muscles used for speech. Trousseau discovered two cases believed to be true aphasia in J. P. Frank, who lived from 1745 to 1821, well known for his work on public health (medical police). Frank himself considered these cases to be examples of alalia due to partial paralysis of the tongue.

[3] "Altogether unexpectedly my father had a shock of palsy; it lamed his right side and deprived him of the proper use of speech! We had to guess at everything

Apprenticeship. Though but a few lines in length, the passage mentioned the patient's inability to express himself by spoken language, the preservation of gestures, and the association of the condition with a paralysis of the right side, thus with a brain lesion of the left side. Nor was F. J. Gall even the first *medical* writer to describe aphasia. The case Ph. Pinel [4] described in his *Traité Médico-Philosophique sur l'Aliénation Mentale* was prior to Gall's publication. As in Goethe's case, aphasia was the result of apoplexy. Pinel, obviously realizing the differential difficulties involved, stressed the undisturbed mobility of the tongue. The type of aphasia described definitely recalls the amnesic type, though the patient was also unable to read and to write. In both cases mentality was not affected.

In his first publication (1825) Bouillaud [5] though adopting Gall's

that he required; for he never could pronounce the word that he intended. There were times when this was dreadfully afflicting to us: he would require expressly to be left alone with me; with earnest gestures, he would signify that every one should go away; and when we saw ourselves alone, he could not speak the word he meant. His impatience mounted to the highest pitch: his situation touched me to the inmost heart. Thus much seemed certain: he had something which he wished to tell me, which especially concerned my interest. What longing did I feel to know it! At other times, I could discover all things in his eyes: but now it was in vain. Even his eyes no longer spoke. Only this was clear: he wanted nothing, he desired nothing; he was striving to discover something to me; which unhappily I did not learn. His malady revisited him: he grew entirely inactive, incapable of motion, and a short time afterwards he died." (Goethe, *Wilhelm Meister's Apprenticeship*, translated by Thomas Carlyle, vol. 11, p. 197-198; London, Chapman and Hall, 1842).

The passage has been brought to my attention by Otto K. P. Rothbarth, New York, who also corrected P. J. Moebius' statement that Goethe's description of a case of aphasia, associated with hemiplegia is to be found in the "Travels," instead of the "Apprenticeship." Goethe's maternal grandfather suffered in 1768 a stroke, resulting in a paralysis of the right side with speech disturbances; this might have been the model on which Goethe conceived his analysis of aphasia.

[4] "The loss of memory which almost always succeeds apoplexy, might be limited to the terms by which we express ideas. After an apoplectic attack, a notary forgot his own name, that of his wife, children and friends, though the motility of his tongue was in no way affected; he could neither read nor write. Nevertheless, he seemed to recognize the objects related to his profession. He pointed with his finger to the folders containing records and contractual engagements which had not been located and he also showed by other signs that he was in full possession of his previous reasonings." (*l. c.*, Second Edition, Paris, 1809, p. 90).

[5] *Arch. Gén. de Méd. 8*:25-45, 1825; *Bull. Acad. Méd. 4*:282-328, 1839; *Bull. Acad. Royale de Méd. 13*:699-721; 778-816, 1847-48.

views of the plurality of cerebral organs [6] and calling the anterior lobes the "legislative organ of speech," went a step further than Gall. He distinguished (for the first time) the faculty to create words as signs of ideas and to retain them in memory, from the faculty to articulate them. Loss of speech, he taught, might be due to a loss of either of these faculties. It has not been realized as yet, that Bouillaud thus made for the first time the fundamental distinction between *external* and *internal language*. This, I believe, was his major and lasting contribution to the subject. But he also reported for the first time on a large number of *pathological* specimens, partially of his own, partially borrowed from the literature. The lesions were sometimes on the right, sometimes on the left, but also on both sides of the brain.

The next step was made by Broca [7] who called "*aphemia*" the inability to pronounce words although the tongue was not paralyzed. His definition of language as the faculty to establish a constant relation between an idea and a sign entirely satisfies a modern reader. He left it open whether aphasia might be intellectual in origin and due to a loss of memory of the articulatory movements or whether it is but a type of locomotor ataxia, limited to the mechanism presiding over articulatory movements; but he was more in favor of the first interpretation. Though clinging to the unfortunate idea that the great regions of the brain are related to the great regions of our mind (thus making a most equivocal use of the word "region"), he believed it to be an insoluble task to decide whether a given faculty has its seat in a given convolution.

Broca, whose name became linked for all time with the doctrine of speech centres, was indeed critical in his approach.[8] He blamed

[6] Gall admitted a special organ for the sense of words, names, memory of words, verbal memory, which he distinguished from the sense of things and facts, localities, persons, relation of colors, sound, number, etc.; but he assigned all of them to the anterior part of the brain (see W. Riese, F. J. Gall et le problème des localisations cérébrales, *L'Encéphale*, *31*: No. 5, Mai 1936 (L'Hygiène Ment.).

[7] *Bull. Soc. Anthrop.* *2*:235-238, 1861; *Bull. Soc. Anat.* *6*:398-407, 1861; *Gaz. des Hôpitaux* *37*:35-36, 1864; *Bull. Soc. Chir.* *5*:51-54, 1864; *Bull. Soc. Anthrop.* *5*:215-217, 1864.

[8] See my "Discussions sur le problème des localisations cérébrales dans les sociétés savantes du 19e siècle et leurs rapports avec des vues contemporaines," *L'Encéphale*, *31*, No. 6, 1936 (L'Hygiène Mentale).

the incompleteness and uncertainty of the conventional analysis of cerebral functions, and his postulate that functional analysis must precede localization, is as timely and necessary today as it was at his time. He first made a tentative localization of aphasia in the second and third frontal convolutions. After the second case had come to his observation, he was more specific and gave preference to the third frontal convolution. Finally he was positive in claiming the posterior part of the third frontal convolution as the critical area of spoken language.[9] This localization still is a part of our actual teaching. Though in both of his famous cases the *left* hemisphere was involved, Broca did not realize immediately the correlation of aphasia with brain lesions of the left side, and when he finally concluded that speech disturbances result from involvement of the left hemisphere alone, he made no attempt to explain this coincidence; he called it a "strange fact." As a matter of fact, the coincidence of hemiplegia of the right side with speech defect was shown for the

[9] Broca's observations and interpretations were submitted to a critical analysis by Hughlings Jackson (1866) and to a complete revision by Pierre Marie (1906). Hughlings Jackson warned against the use of terms as "mémoire des moyens de coordination," because they recall "distinct faculties." But he supposed "M. Broca means by memory of words the connection the seats of motor impulses (co-ordinating centres, or whatever they may be called) for words have with that other part of the nervous system (whatever and wherever it may be) which set them a-going" (*Brain*, 38:55, 1915). This qualification is only understandable in the light of Hughlings Jackson's basic assumption that we have only to deal with the nervous arrangements or physiological processes underlying speech, but not with mind or mentality. Pierre Marie was able to convince his audience that the lesion in Broca's first case (Leborgne) was much too extensive to justify Broca's localization of aphasia in the third left frontal convolution. But Pierre Marie's endeavor to throw the doubt on the lesion as well as on the aphasic nature of Broca's second case (Lelong) met the strong resistance of Déjerine who reaffirmed that this case was the most typical and most instructive case of motor aphasia ever described in the medical literature, and that this brain showed a gross lesion in the posterior part of the third left frontal convolution. The famous discussion of the Paris Society of Neurology, July 9, 1908, which discussed the subject, has an importance reaching far beyond the topic treated. The historian interested in the doctrine of methods in medicine will notice the very strange and significant fact that there can be disagreement and argument between the most eminent observers about the very existence of a *gross* lesion, the argument reflecting the critical character of *ma*croscopic observation as of an undebatable criterium in empirical research.

first time about 30 years before Broca's statement by Marcel Dax; it was re-affirmed by his son in 1865.[10]

The discussions on aphasia at the meetings of the Académie Impériale de Médecine in 1864 and 1865 [11] can be considered as the climax of the early history of aphasia. Speech disorders occurring without any paralysis of the tongue or other purely instrumental organs were now uncontested facts, and aphasia was recognized as a *syndrome* of its own. The time however for the establishment and description of various *types* of aphasia had not come as yet. The contemporary reader is most impressed with the fact that the possibility of disturbances in *comprehension* of spoken language was scarcely touched upon, though an analysis of language function in its various aspects was made by not a few who contributed to the discussions. At best one might admit of an anticipation of amnesic aphasia, the nature of which was stressed more specifically by Piorry who suggested the term *amnémonomie*. But greater attention was focused on the *articulatory* defect, believed by some to be an isolated and coordinatory disorder, by others to be always associated with disturbances in memory, attention and intelligence. The striving for an interpretation of aphasia on the basis of more general disorders affecting the individual as a whole had begun.[12] Bouillaud, whom we know already as a strong adherent of Gall and the doctrine of the faculties, credited himself again with a new step in our subject; but he was now more specific in his distinction between two components

[10] *Gazette hebdom. de méd. et de chir.*, 2e serie, 2: 259-260, 260-262; 1865.

[11] *Bulletin de l'Académie Impériale de Médecine*, tome III. Paris, 1864-65.

[12] The meetings of the Société de Neurologie de Paris, June 11 and July 9, 1908, were again the theatre of a struggle between a concept of aphasia based on distinction and isolation of types and entities and an interpretation on more general grounds. But since the first discussion held by a learned society on aphasia (1864) neuro-anatomy had made such progress, that by far most of the time was now devoted to the anatomical aspect of the subject. As a matter of fact, the discussions were dominated by the problems of the types of aphasia, their purity and the cerebral regions to which they should be related. The *ontologic* concept of aphasia had become most powerful, and an entity was understood to derive its rights of existence mainly from *anatomical*, less from clinical, but not at all from psychological facts. Even such broad-minded men as Pierre Marie explained differences in behavior by differences in involvement of structures (but not by physiological or psychological rules presiding over speech under changing conditions).

in articulated speech, one being essentially intellectual, the other mechanical in nature. The former concerns the words, names, representative symbols of our thought; these have to be created, formed, invented or learned, comprehended and retained. The mechanical component deals with the movements by which these words are expressed, pronounced, articulated, and these movements will have to be formed, learned and retained in their turn. He re-affirmed that that type of speech defect which has its origin in a disorder of the coordinatory or *legislative* power was still unknown to Gall. Bouillaud, though definitely localistic or, to use a contemporary slogan, "atomistic" in his approach, nevertheless realized to its full extent the representative and symbolic element in language.[18] Parchappe expressed himself in the same way when he declared that "tout langage humain . . . consiste essentiellement à rattacher fixement des signes d'une nature quelconque, parole, écriture, dessin, geste, mouvement etc., à la représentation d'idées correspondantes dans l'expression d'une pensée" (*l. c.*, p. 680). Once again Bouillaud called the representative or symbolic element internal language ("parole intérieure"); humanistic tradition still strongly alive among the physicians of this era, led him to use terms such as *verbum* or *logos*. He opposed it as early as 1825 to the spoken, articulated or external language. Both these components he believed to be localized in the anterior part of the brain, the gray matter being perhaps the seat of the intellectual element or internal speech, the white matter that of articulated or external language.

Trousseau was Bouillaud's antipode in every respect. He considered aphasia to be a disorder of speech as well as of thought ("trouble

[18] Bouillaud also admitted and re-affirmed "des moyens de communication ou de correspondance entre le pouvoir *articulateur* et le pouvoir *créateur*, *législateur* et *coordinateur*" (*l. c.*, p. 731). Baillarger saw in aphasia "un trouble fonctionnel dans les rapports de la volonté et de l'instrument" (*l. c.*, p. 827); the experienced reader realizes the identity of this interpretation with Hughlings Jackson's views.

As a matter of fact Hughlings Jackson referred to Baillarger's observations, but affirmed at the same time that nobody but himself had advanced any hypothesis as to the duality of word-processes, and the relation of elements of the dual to halves of the brain (*Brain*, *38*:90, note No. 2; 1915); what was meant, was Jackson's correlation of voluntary speech with the left hemisphere, and of automatic speech with the right one. The claim for priority is most unusual in Jackson's writings and may be indicative of the great importance he gave to the subject and his doctrine.

corrélatif du langage et de la pensée"), resulting, almost always, if not constantly, from a disorder of various *general* intellectual faculties, particularly of memory and attention.[14] Contrary to what Broca believed, he held that intelligence is always affected in aphasia, due to the memory defect, and he saw in this assertion the major part of his own contribution to the subject. But Trousseau, whose figure seems to the contemporary reader the dominant one at these meetings, also made another important contribution by calling attention to the *nature* of the lesion[15] as a factor which determined the symptoms. The same problem was also discussed by others, though under a different heading. When at the meeting of the Académie held on May 16, 1865, Bouillaud defended his views on localization of speech and aphasia, he had to discuss a case presented by Velpeau to the Academy on April 11, 1843. A 66-year old hairdresser was affected by mental changes, loss of decency and an almost uncontrollable masturbation; he also showed what was called "habitudes de moquerie," and what was most probably the well-known obsessive joking ("Witzelsucht") of patients affected by brain tumor. The sexual symptoms existed for many years. Autopsy revealed a very firm, lobulated and apparently benign neoplasm destroying the major parts of both frontal lobes, particularly the right one. There was never any speech defect in spite of this very extensive, bilateral, obviously slow growing neoplasm (probably a meningioma). The case was used by Bouillaud's opponents as a test case for their antilocalistic views. Bouillaud reacted in the way any adherent of cerebral localization would have reacted and also would react today: by discrediting the completeness of the clinical examination and by pointing to the

[14] "J'avoue ne pas comprendre qu'on puisse songer à une formule de langage sans se rappeler aucun des mots qui la composent. J'avoue ne pas conçevoir qu'on puisse penser, sans corporifier l'acte intellectuel à l'aide de mots ou, de signes symboliques qui matérialisent en quelque sorte la pensée et la dégagent des nuages de l'abstraction" (*l. c.*, p. 672).

[15] This historical merit of Trousseau was recognized for the first time by C. v. Monakow (in his *Lokalisation im Grosshirn*, Wiesbaden, 1914). Since the nature of the lesion is indeed a major though somewhat neglected factor in localization, and since it plays a major role in contemporary discussions on the effects of frontal lesions (pre-frontal lobotomies), the early history of the subject is here presented in some detail.

parts of the frontal lobes which still remained as the structural basis of preserved speech. It is obvious that this answer was more a postponement, even an evasion, than a solution of the problem. As early as 1839 Bouillaud reacted in the same way when he was compelled to discuss a case of Lallemand which is still of the greatest interest to the contemporary reader (*Bull. Acad. Méd.* 4:282-328): eight years after a head injury on the left side (5 years after a parietal injury on the right side), a 59-year old soldier developed headaches, vertigo, dizziness, succeeded by incomplete amaurosis and dilatation of the pupil of the left eye, somnolence, finally epileptiform seizures, hemiplegia of the left side, followed by death in a coma. There was a *firm* tumor of the left anterior lobe. At no time was there any speech defect. In my opinion the solution of these negative cases of aphasia is to be found in the (gradual) *mode of onset*, resulting from the nature of the lesion. It is much more difficult to explain the case of that 50 year old man who was admitted as insane to the State Hospital of Nantes in 1836 or '37; this patient's speech was severely affected and became entirely unintelligible 18 months before his death. Bouchet found a bony neoplasm of the size of a nut, which destroyed almost the whole homolateral and compressed the contralateral frontal lobes. But Bonnefont, who mentioned this case at the meeting, made the most enlightened and profound remarks on the effect exerted on the symptomatology by the rapidity with which a lesion grows (in lesions occurring gradually and very slowly, he said, the opposite lobe retains its function). I found a similar observation made as early as 1836 by M. Dax (*l. c.*). Preservation of speech in spite of involvement of the left hemisphere would mean no exception to the rule, he said, provided the lesion was slight or slow in onset. Bonnefont then turned to brain injuries and gun-shot wounds as show-pieces of experimental physiology in the human. Injuries destroy a given cerebral function *suddenly*, thus simulating animal experimentation, while slowly developing diseases entail successive and increasing changes of various cerebral functions, particularly of intelligence and thought.[16] On the other hand, animal experimen-

[16] Obviously, Bonnefont here referred to the various *stages* of disease. Apparently he was inclined to deny to brain injuries any *historical* character. But most of the material he presented concerned wounded soldiers who died more or less im-

tations which might be most instructive as to motion and sensation are inappropriate methods for the evaluation of functions involving thought. That is why he believed brain injuries to be the most suitable objects for the study of cerebral localization. The side of the brain on which lesions are likely to produce speech disturbances remained unsettled, in spite of the contributions of the Dax's and Broca's localization of aphemia in the posterior part of the left frontal convolution. It was most unfortunate that the problem was discussed as that of a special *function* of the left hemisphere, different from that of the right one. The assumption that one of two perfectly symmetrical organs should serve a function of its own, must hurt the common sense, said Trousseau,[17] who also denied to this doctrine its factual (statistic) background. Lelut, charged with the report on M. Dax's " Observations tendant à prouver la coïncidance constante des dérangèments de la *Parole* avec une lésion de l'hemisphère *Gauche* du cerveau," had already declared that the brain, mysterious organ, would become still more mysterious if the two hemispheres were to subserve different functions. The problem was not discussed as that of a correlation of *aphasia* with brain

mediately after injury. They did not survive the stage of *diaschisis* or neural shock in which there is total lack of function. The contemporary neurologist has learned that diaschisis is but the initial stage which, when survived, is succeeded by the stage of *residual* symptoms. Ever since C. v. Monakow demonstrated it, we know that even brain injuries have their evolution.

[17] In a paper published by Trousseau in 1864 (De l'aphasie, maladie décrite récemment sous le nom impropre d'aphémie; *Gazette des Hôpitaux*, *37*:35-36, 1864) I discovered what is in all probability the first description of *re-education of speech* in amnesic aphasia. A very intelligent and cultivated woman became affected by complete aphasia. She lost the memory of all words, but she regained them in the following way: First, she repeated every question after the person who made the question, thus reviving the memory of the spoken words. Then, a friend recalled to her memory with utmost patience the most usual terms, word by word. Soon the patient had a new vocabulary and could express her thought in some sentences. She now asked for a note-book in which she put down for six weeks and with admirable regularity not only the words pronounced in her presence, but also all those she could evoke by herself. E. g., she had an inkstand (and other objects) on her desk. She wrote down in her note-book: inkstand. This evoked the word pen, the latter evoked bird (the French word for pen—" plume "—is identical with feather), bird led to fowl, fowl to stuffed goose liver. The first word evoked a strange series of other words, either by consonance, or by rhyme, or by its special meaning. In this way the patient re-constituted her language.

lesions of the left side, but as that of a localization of *speech* in the left hemisphere. The door was open to speculation. It is of utmost significance that the doctrine of lateral cerebral dominance originated in the mist of this speculation. To the contemporary neurologist the association of right-handedness with left cerebral dominance seems to be a *fact* beyond doubt. But this basic and almost uncontested element of the whole doctrine of aphasia and nervous function, was born before any factual evidence for its correctness was available. How did it come into being? Bouillaud, not satisfied with Lelut's categorical refusal to admit two different functions for two symmetrical organs, recalled the difference in performances made by the right and the left hand and the distinction between right- and left-handedness, the latter believed by him to be exceptional. Would it not be conceivable that we were left-handed as to certain acts, e. g. language? These words indeed marked the birthday of the doctrine of left cerebral dominance, since for the first time speech was linked with handedness. They were spoken at the meeting of the Académie Impériale de Médecine in April 4, 1865. At a later date, May 30, 1865, Baillarger referred to the fact that all nations are right-handed, that we write with the right hand; these facts and the difference in circulatory arrangements between the right and left hemispheres as well as the early development of the left frontal convolutions, seemed to throw some light on the strange fact that in 15 out of 16 cases of aphasia the left hemisphere was the site of the lesion.[18] Hughlings Jackson (1874) was the first to use the term "*leading hemisphere*," when discussing the "Nature of the

[18] The contemporary reader who tries to interpret these discussions in the light of modern approach and improved knowledge, will notice that the various speakers, when describing aphasia, started from an analysis of normal language, which they decomposed in its hypothetical elements, in order to identify aphasia with a (disordered) *fragment* of normal speech. It took a century to realize that aphasia, whatever special type or stage it may assume, is a very complex behavior of its own, a new, but fully integrated one, neither reflecting fragments of normal speech, nor leaving intact others (Henry Head). Similarly, localization of *speech* was the subject of the discussions (with one exception however: Trousseau), though the factual evidence offered only material for a localization of speech *disturbances*. Again, it took another century, to substitute the localization of *symptoms* for the localization of *functions*; this was achieved by C. v. Monakow, though initiated by Hughlings Jackson.

Duality of the Brain [19] and the role assigned to the left hemisphere. He concluded from loss of speech from damage to but one—the left—half of the brain that, as regards use of words, the brain is double in function. He considered the speechless patient still to be able to receive speech, to understand it and to *utter* words (under emotional stress), though not to *say* them (on request). He also believed reception of speech and "interjectional" language (recurrent utterances, oaths, etc.) to be more automatic than "propositional" speech, which alone is lost in lesions of the left side of the brain (involving the region of the corpus striatum). He concluded that the right hemisphere is the half of the brain for the automatic use of words, the left the half for both the automatic and the voluntary use. He was inclined to consider the left hemisphere to be the "firstborn," and he mentioned right-handedness as correlated with what became later known as "left cerebral dominance."

C. E. Brown-Séquard's "Toner Lecture" on the "Dual Character of the Brain" was delivered on April 22, 1874, in Washington, from a phonographic * report of which the lecture has been printed. On account of absence from the country, the author did not have the opportunity of revising the lecture or of correcting the proofs. In this lecture which remained entirely unknown to the student of our subject, Brown-Séquard concluded that "the very fact that the loss of speech depends on a disease in the left side of the brain is itself an evidence that the left side of the brain is quite distinct from the right side; that it is in fact a brain in itself as regards that particular function of the organ we call the brain." Anticipating the works of Pierre Marie, Henry Head, K. Goldstein and others, he declared in regard to speech, that—although mechanical when defective and something like a gesture—"there is a mental sign in it"; he could not but consider defective speech as representing some mental trouble. He referred to the interpretation of speech disorders by his pupil, Hughlings Jackson, "who has become a very eminent man since" and who also insisted on the point that it is the memory for

[19] *Medic. Press and Circular*, Jan. 14, 1874, Vol. 1, p. 19; Jan. 21, 1874, Vol. 1, p. 41; Jan. 28, 1874, Vol. 1, p. 63.

* The term "phonographic" is an early expression for what is more commonly referred to today as "stenographic." [The Editors.]

direction of movements of the muscles which serve to articulate, which is lost, and not the mere power of moving the muscles of the tongue, larynx and chest. He did not mention Trousseau, though this eminent French clinician had declared years before that the aphasic is an amnesic who has lost the memory of the means by which thought can be expressed in speech, writing and gestures ("L'aphasique est, en fin de compte, un amnésique" . . . "il a perdu la mémoire du moyen par lequel la pensée doit se manifester par la parole, par l'écriture et par le geste").

Brown-Séquard not only believed that the left side of the brain is "leading" in speech, gestures and writing, but also in *intelligence*. Since agraphia was found to be connected with the left side of the brain in persons who are right-handed (and with the right side of the brain in persons who are left-handed), he believed that side of the brain which serves the motion of one side of the body to be the one that serves chiefly to the mental life: "The mental life of our system, therefore, seems to be developed considerably in the organ which itself seems to be developed in a great measure owing to the action of will in one-half of the body. There is certainly a connection between these things, but that will come out more by and by." In 1898, Bastian, not quoting Brown-Séquard and probably having no knowledge of his "Toner Lecture," discussed the causes "which have determined the greater or almost exclusive influence of the left hemisphere in inciting speech movements." He said that "it is . . . now pretty generally agreed that the immediate or proximate cause is to be found in the fact of the predominant use of the right hand, which entails a greater functional activity upon the left cerebral hemisphere." The left hemisphere was considered to be "the more potent and seems to take the lead in some thought-processes, as well as in giving rise to the voluntary excitations which determine the muscular acts involved in articulate speech." [20] In 1898, i. e. 24 years after Brown-Séquard's Toner Lecture, the principle of left cerebral dominance had already become a subject of general agreement.

When finally Liepmann [21] described his apraxia, he made no claim

[20] *Aphasia and Other Speech Defects*, London 1898, p. 33.

[21] Most instructive and comprehensive is his: "Die linke Hemisphaere and das Handeln," *Muenchner Med. Wochenschr.*, *52*, 1905.

of priority as to the principle of left cerebral dominance. He referred to the two Dax's and to Broca as his predecessors, and he imputed to himself only the discovery that the left hemisphere leads in *purposeful acts*, though not to the same degree as in language. His main contribution to the subject was indeed the description of his " sympathetic dyspraxia " of the left hand in brain lesions of the left side (or hemiplegia on the right). Though he made the wise remark that localization should be understood to be the *abolishment* of function by lesions of the left hemisphere, he nevertheless believed the *activity* of the right hemisphere to be under the guiding influence of the left one. He saw in left cerebral dominance the major part of man's superiority when compared with the animal, and he interpreted it in the light of the greater use and training of the right hand. He appealed to the corpus callosum as a structure transmitting the dominating influence exerted by the left hemisphere on the right one in right-handed persons. To the principle of left cerebral dominance was thus given its *neuro-anatomical* equipment. We are no longer in the early history of aphasia, but in the midst of its classical period.

Epilogue

What can we learn from the early history of aphasia?—

Though, of course, the *factual* evidences were still very small at the beginning of this history, the *problems* involved in aphasia appeared in their totality with almost explosive suddenness, above all the *symbolic* nature of the functions and symptoms implied in undisturbed and disturbed speech and the *correlation* of aphasia with more or less well-defined regions of the brain. It seems that this piece of human knowledge was not gained by an adding together of an ever increasing number of fragments, but rather by an epigenesis of a material, at first crude though already organized, unfolding little by little the elements comprised in it potentially. Criticism and arguments did not wait until knowledge was complete, but appeared at the very beginning of the doctrine, which was shaped by those who propounded as well as by those who fought and reviewed it.

OBSTETRICAL TRAINING IN VIENNA ONE HUNDRED YEARS AGO

In Commemoration of the Hundredth Anniversary of Semmelweis' Concept of the Principle of Asepsis

FRANK P. MURPHY

One of the three main divisions of the Vienna General Hospital was the lying-in or maternity division an institution which was the realization of a pet project cherished for many years by the Empress Maria Theresa (1717-1780). The supermultiparous Empress, of course, had an intensely personal interest in maternal welfare, and in some of her letters are to be found technical, objective discussions of a few of her own obstetrical episodes by way of advice to inexperienced daughters and daughters-in-law; e. g., in one of them she goes into detail about the advantages and disadvantages of being delivered in bed or on an obstetrical chair. She had long been aware of the need for a hospital in which the large number of unmarried gravidae could have competent care during confinement and midwives as well as medical practitioners could be given adequate training in obstetrics. Unfortunately, she was not to witness the fulfillment of this particular ambition for she died in 1780, and the maternity hospital was not opened for the reception of patients until August 16, 1784.

Josef II (1741-1790), her son and co-regent for a time, in order to carry out his mother's wish, ordered in a decree dated April 13, 1784 that a secure place of refuge was to be provided for " the many seduced females who are under the compulsion of shame and necessity, and for the preservation of the blameless, unborn offspring which they carry in their wombs, so that they may at least be brought to Holy Baptism. The strictest secrecy is to be observed in regard to the patients admitted and no patient is to be asked for her name, much less for that of the father of her unborn child. No legal certificate is to be demanded of anyone, nor are husbands or parents to

have ground for action, if they have no other proof than that the person they are seeking has been in this place of asylum."

Such a decree was undoubtedly intended by the somewhat social-minded Josef to satisfy a great need. Wilde states that during the seven years previous to his visit to Vienna there were 44,773 illegitimate births against 56,394 infants born in wedlock. As a contributing factor he cites the fact that, while there was schooling available for all, matrimony was difficult, sometimes almost impossible for a man and a woman from the poorer classes, and also that an illiterate person was forbidden by law to marry. Arneth wrote several paragraphs in an attempt to soften this indictment, but gave figures for illegitimacy that corresponded very closely with those of Wilde.

Accordingly, if a young woman had need of the care afforded by the Vienna Lying-in Hospital, she learned from someone, who perhaps had had personal experience, that the patients in the maternity divisions were divided into two groups: those who could pay for all or part of their care, and those who were completely destitute. If she sought admittance and secrecy as one of the first group, she would be assigned according to her means and possibly also her obvious social position to one of the two classes of accommodation in the pay-division (*Zahlabteilung*). In the first class there were private rooms which were isolated and guarded to provide the greatest possible seclusion and accessible only to the attending physician and the necessary nurses.[1]

The patient with ample means could bring with her such servants, bedding, linen, and other comforts as she chose. (Not a few young ladies from the higher ranks of society in Vienna were familiar with this part of the hospital.)

[1] The word "nurse" is used here only for lack of a more exact term. The German word for the "nurse" of that day was *Wärterin*, the feminine gender of *Wärter*, a keeper or attendant, which in turn is a not-too-distant relative of our "warder," also a keeper or sentinel. The "nurse" might have been a midwife (*Hebamme*), either certified or in training, or she could have been a waiting gravida. Such attendants usually had only a minimum of education and were trained to do certain tasks, mostly menial, in and about the wards, but through no fault of their own had no conception of the duties of a trained nurse. The latter, as we know her, was still just a notion being incubated in the mind of "The Lady with the Lamp."

If the patient could not afford such extreme privacy, there were available also two six-bed wards or several ten-bed wards, into which she could enter, usually after the sixth month of pregnancy, and still maintain some degree of anonymity.

The unfortunate expectant mother seeking refuge in the pay-division was not required to go through the public entrance of the lying-in hospital , but could slip up a corridor between two buildings that had no windows overlooking it. If she wished, she could enter masked or veiled, or otherwise disguised, through this private entrance, where there was a porter on duty throughout the twenty-four hours to conduct the new patients to the particular class of accommodation they requested. Once within the building, she could stay as long as she pleased and could leave her baby for adoption or take it with her on departure, just as she wished. There was only one stipulation other than the pay in advance; that is, she had to write her name and home address on a slip of paper, which was then folded in her presence without inspection, sealed by the attending physician with the number of her room or her bed written on the outside, and locked up in a small cabinet at her bedside to be returned with the seal intact when she was ready to leave, or to be opened for her identification only in case of her death.

If the gravida could not afford to pay for either of the two preceding classes of service, she would be assigned to the free division (*Gratisabteilung*), where she would serve as material to be used in the obstetrical training of the graduate students or pupil-midwives. No visitors were permitted in this portion of the buildings, nor could the police or a relative by blood or marriage get any information about the patients, even with a court order. On the other hand, if a patient wished to consult any physician of her choice or to have a clergyman visit her, she was free to do so.

If our young woman sought admission to the free division, whether she was illegitimately pregnant or not, she had to be either a pauper with a certificate of poverty, a soldier's wife, or a gravida from some public institution; for example, from the medical or surgical wards of the General Hospital. Married women were admitted only on the presentation of a pauper's certificate, while widows were admitted under the same conditions as unmarried

females. The so-called respectable married woman was expected to go elsewhere for hospitalization, if for some reason she did not choose to abide by the unwritten law which required her to have her baby at home "like a decent woman."

If, by accident or design, her baby was born shortly before the patient reached the hospital, she was admitted at once and questioned later.[2] She was also taken in immediately, if she had aborted or was about to do so. In whatever way she might be eligible, she could enter at the seventh month of pregnancy, or even earlier in special cases. The clothing she wore on arrival was put away carefully, and she was given in exchange the time-honored, hideous

[2] Vienna was a larger city in the 'forties. Some of the expectant mothers had to travel a long way to reach the lying-in hospital. If they did not start for the hospital soon enough after the labor-pains had set in, or if the progress of labor was more rapid than had been expected, it was not unusual for these hapless women to have the crucial moment come upon them, regardless of the weather, on a public thoroughfare or while crossing the glacis, and then to appear at the entrance of the lying-in hospital carrying the baby wrapped in an apron. These were called "street-births" (*Gassengeburten*).

As noted above, gravidae who applied for care at the maternity division of the General Hospital and were unable to pay for it were expected to allow themselves to be used as teaching material for the training of graduate students or midwives. The patients who claimed to have delivered unexpectedly while on the way to the hospital were given the benefit of the doubt, especially if the infant had not been bathed and the stump of the umbilical cord still had a fresh look. The concessions made to the *Gassengeburten* were abused, because rather well-to-do girls, in order to avoid being used as teaching material, had themselves delivered by midwives somewhere, perhaps even close by, in the city and were then brought to the hospital by carriage.

The number of street-births in the two clinics frequently was more than one hundred a month.

Späth cites 220 *Gassengeburten* admitted to the hospital during three winters. Though these women had been exposed to the extremes of cold, only one of them died and she only after a difficult version and a serious post-partum hemorrhage outside the hospital. One woman, whose baby was four days old, was brought to the hospital after a four-hour ride in an open wagon from Pressbaum with no ill effects from the exposure, although the weather bureau thermometer registered 7.4° R. below freezing on that particular day at 2:00 P. M. He also recalled having seen when he was an Assistant newly delivered women applying for admission, whose chemises were saturated with blood and liquor amnii and frozen stiff. One robust character appeared at the door with the baby in her arms, the placenta still in the uterus, and the pendent portion of the umbilical cord well on its way to becoming an icicle.

hospital garments to wear for the duration of her stay. She could wear a veil during her entire residence in the hospital if she wished to do so. The only work she was usually required to do was to assist in keeping her ward clean. For the gregarious, the benches in the adjacent courts were always available for some friendly gossip.

After delivery, if she had escaped the perils of the ever present child-bed fever, she was transferred with her infant to the Foundling Hospital (*Findelhaus*) almost directly across the street from the main entrance to the General Hospital. Here she received another outfit of drab and shapeless garments to wear during her service there. She was now required, if found suitable, to do something further to earn her board and keep; that is, she had to nurse her own infant at the breast and one other besides.[3] During the period of Semmelweis' service in the First Division, and for some twenty years before for that matter, there was a surfeit of motherless infants, due to the high mortality from puerperal fever among the new mothers. This, however, was nicely canceled by the frightful mortality in the *Findelhaus*.

The Foundling Hospital, a two-story building with five large and airy wards on each floor, was intended chiefly for the care of the myriads of illegitimate infants born in the lying-in hospitals every year, but did accept legitimates also, whose parents could not care for them because of sickness or poverty, or for some other acceptable reason. The infants were almost all breast-fed, sometimes by their own mothers, and were cared for by nurses who lived in the wards with the infants. The wards were clean and orderly, considering the large population of the house, but the noise generated therein was appalling. The acoustics, but not the health, of the institution were improved by a simple device. Each infant, no

[3] She was subjected to an examination by which it was decided whether she would make a good wet-nurse (*Säugamme*), i. e. could she provide an abundant supply of breast-milk. It may be assumed that if she was suffering from any obvious or supposedly communicable disease, she was rejected. Any of the skin lesions which were then regarded as of syphilitic origin would very likely be cause for rejection. The Wassermann and other blood tests for syphilis as well as the discovery of the *Spirochaeta pallida* were, of course, still far beyond the medical horizon. If the accepted wet-nurse had open pulmonary tuberculosis, it was just unfortunate for the babies she was required to nurse.

matter whether breast or spoon-fed, was given a pacifier in the form of an artificial nipple called a *Zuzel or Zulp* (onomatopoeia?), made of a piece of cloth in which about a spoonful of pap or bread and milk was wrapped. This sodden nipple was supposed to provide nourishment of a sort and was crammed into every infantile mouth that seemed to be about to emit a cry. A " good " nurse was expected to give a baby a new one every twenty-four hours (sic), but one who was disposed to economy of energy might leave it more or less in place for a week at a time. Wilde saw them in the mouths of infants who could not have been more than a week old.

From 1784 to 1838 inclusive, 146,920 infants died out of 183,955 admissions. Referring to the *Findelhaus*, Kussmaul says, " As long as the means for combating sepsis were but inadequately known, these institutions founded with a praiseworthy motive, were scarcely better than murder dens."

When the temporary wet-nurse's stay of two months in the Foundling Hospital came to an end, she received a bonus of the approximate value of five English shillings. If she was in good health and desired further employment, the nursing-office in the same building would almost invariably secure her a position as wet-nurse, usually in the household of a noble or well-to-do family in the city.

In any event, according to Wilde, she would often turn up at the lying-in hospital as a patient again in eighteen months or less, perhaps even for a third time.

The fate of the infant, if it survived, is interesting. After the two-month stay in the *Findelhaus*, it was installed in a country household. A male infant was always welcome in most peasant families, because at the age of eighteen the Imperial Army would accept him for conscription as a substitute for the farmer's own son.[4]

Wilde alleges that a baby of Jewish descent was never returned to its mother.

In the 'forties, the lying-in hospital was made physically and administratively of three divisions: the First, or Clinic for Physi-

[4] Arneth qualifies this assertion somewhat in saying that the mother had the right at all times to know where the baby was and how it was being cared for, to visit it if she wished to do so, and to take it back at any time.

cians, under Professor Johann Klein (1788-1856): the Second, or Clinic for Midwives, under Professor Franz Xaver Bartsch (1800-1861): and the Pay-Division (*Zahlabteilung*), already mentioned, also under Bartsch.

Eduard Caspar Jakob von Siebold (1801-1861), an obstetrician of note, a distinguished medical historian, and a member of a well-known Aesculapian family, visited Vienna in 1843. To him we are indebted for most of the following account of the internal workings of the Clinic for Physicians.

The First Division, with which we are principally concerned, was made up of six large wards for puerperae with an average of thirty beds each, (one a sick ward for seriously ill patients), one ward for gravidae (the largest, possibly the one described by Braun as 124 feet long), and a labor-ward with sixteen beds (fourteen for parturients, two for the midwives on duty).[5] In addition, there were two rooms with twelve beds each for the *Praktikanten,* chambers for the Assistant, and rooms for the midwives and attendants.[6] The wards would be viewed with a jaundiced eye by a hospital architect of today, for they were fifty-four to seventy-two feet long and twenty-seven feet wide, with ceilings sixteen feet from the floor. The beds were precisely equidistant from one another as in the other clinics. The windows did not extend below a level of six feet from the floor, ostensibly to prevent a direct draft from striking the patients. All the windows in the First Division opened in the clear, but in the Second (the original building of the lying-in hospital) the windows in one of the long walls opened on a corridor, which ran alongside the wards. Each pair of wards in the First Division was separated by a kitchen or two small rooms. To reach the last ward in the row, one had to pass through all the preceding rooms.

[5] The Boston Lying-in Hospital still had no labor-ward or delivery room in 1887, each patient being delivered in the bed to which she was assigned on admission. There was no labor-ward or delivery room in the Rotunda Hospital in Dublin in 1843.

[6] Since there were forty-eight graduate students, half working by day and the others by night, these twenty-four beds, to use the terminology of the boom-time rooming house, must have been "hot beds."

The privies attached to the wards were open and had iron gratings fixed in them for the prevention of infanticide. Furthermore, they were not to be used during the first week after delivery by the puerperae, who were served with bed-pans (often made of wood) by the attendants.

Wilde gives a total of 384 beds for the two divisions and 57 for the Pay division.

The physicians who visited or worked in the lying-in hospital in Boer's time were unanimous in their praise of the good housekeeping and exemplary cleanliness in the wards. Since Klein, Boer's former Assistant and his successor also, did his uninspired best to emulate his master, we have a right to assume that the wards were clean and well-kept under his supervision.

But there was another side to the picture. Joseph Kucher, an obstetrician in New York City, and a former Assistant under Späth, wrote some forty years later: "The Vienna Lying-in Hospital is enclosed on two sides by wards of the general hospital, in which wards all varieties of zymotic diseases are treated. To the rear, and almost contiguous, is a large military hospital: in front, is a row of cesspools of an immense barracks, the stinking emanations from which can often be detected by smell in rooms of the lying-in hospital. Under the lying-in hospital runs a large sewer, in part of which its contents must overcome gravity and travel up hill. And, as though all this were not sufficient, the site of the lying-in hospital was formerly a cemetery. It would seem as if human ingenuity had done its utmost to concentrate epidemic, telluric, and atmospheric influences upon this lying-in hospital, in which nine thousand women are confined annually, and in which five hundred to eight hundred puerperal women are crowded summer and winter, often more than thirty in a single room, almost every woman before and during labor being examined by several physicians and students." While the foregoing has not been quoted to imply that sewer-gas and fetid odors had anything to do with the causation of childbed fever, yet such a belief persisted long after the advent of bacteriology. The passage does show that certain conditions were endured because they were regarded as unavoidable. Gustav Braun (1829-1911) reported a little later much to the same effect in regard to

the Midwives' Clinic, complaining that the privy walls were infected through and through, while the escape of sewer-gas from the down-pipes of the privies could not be prevented because the valves functioned badly. (This statement borders on the mysterious, because his brother, Carl, boasted that he had siphon water-closets installed in the First Division in 1863.) Gustav claimed that, despite the strictest antisepsis and the sterilization of the linens, septic cases still occurred as the result of an undemonstrable etiology, yet he was convinced that the bad odor in the privies and the sewers was mainly at fault, although he admitted in almost the same breath that many of the attendants (*Wärterinnen*) were lacking in the necessary asepsis.

At the time of v. Siebold's visit, ten certified midwives [7] were employed in the Clinic for Physicians. One of these was the Chief-Midwife, whose duty it was to be present *at every labor* and to examine the placentae each morning to assure herself that the membranes had been expelled intact. A second midwife was the housekeeper (*Schaffnerin*), who kept the labor-ward in order. Four of the others were on duty by day and four by night. Each midwife was assigned in rotation to a parturient and had to remain with her patient until the end of the labor, in order to tie the umbilical cord (sic), to bathe

[7] The midwives had a minimum of education, but often had years of practical experience and thousands of cases behind them. On the Continent there was an intimate relationship between them and the medical profession, because the majority of women were delivered at home by licensed midwives in Austria, Germany, and other European countries. Usually each midwife, after she had finished her training and had passed the State examination, was assigned to a certain district in the country or in a town or a city, where she carried on her obstetrical practice under the supervision of a district-physician. She was supposed to notify her supervisor whenever one of her gravidae was not doing well, or in case of trouble during a confinement. The better educated women were not attracted to this type of work, and as a consequence greater difficulty was encountered in the supervision of the midwives, when a major reform, such as the use of antiseptics during labor, was introduced into the practice of obstetrics. Many of them, usually the older ones, could not understand or see any necessity for such an innovation. One sidelight on the midwife has been given by Alfreda Withington in the account of her stay in the *Allgemeines Krankenhaus* in 1888, in which she tells how the pupil-midwives were lined up each morning to have their fingernails inspected by the Professor (Gustav Braun). We have no reason to believe that the midwives were very much different then than in Semmelweis' time.

and dress the baby,[8] and to assist the mother in putting it to the breast for the first time. In addition, three nurses were on duty in each ward, along with such gravidae as were capable of doing some of the lighter work around the wards.

Rounds were made twice a day by the Director, the Assistant, and the graduate student in the morning at eight o'clock, and by the Assistant and the students at four in the afternoon. When the Director with his unwieldy retinue paraded through the wards, he could do little more than to comment on the interesting cases and order the necessary medicines, which were then noted down and administered later by the " journalists."

The food for the puerperae came from the kitchens of the General Hospital, where it was sampled each day by a *Primarius* in his turn.[9]

The gravidae were admitted to the First Division, the larger one, four days a week; to the Second on the other three days. If a woman in the ward for gravidae went into labor, she was taken directly to the labor-ward. Other patients in labor came from their homes in the city at large, from the country, and from other institutions. Each prospective mother was expected to provide what represented a layette in those days—the swaddling clothes and whatever went with them. The minimum requirement was a small piece of ostensibly clean cloth to be used as a cord-dressing.

As for the training of the physicians, there was room for forty-eight *Praktikanten*, about half of whom might be " foreigners," graduates of medical schools outside of Austria. It might be inferred from Semmelweis' *Etiology* that undergraduates were in attendance at the First Division, but according to Wilde and others the practical training in obstetrics was given only after graduation.

[8] Each infant was placed on a pillow, to which it was bound so tightly by a long roller bandage that it could move only its head. No mention was made of the other garments or accessories. The infants were kept in cribs near their mother's beds.

[9] The post-partum diet: first and second day—soup only; third—white bread with conserves added to the first item; fifth day—cooked fruit added; seventh day—pudding added; ninth day—roast veal added. The white bread was sometimes a roll or *Semmel* (plus *weiss* white makes *Semmelweis*). Among the beverages was a preparation made from extracts of the roots of grass, marshmallow, and liquorice. Tepid drinks were used to promote a mild perspiration, which was regarded as beneficial. Plenty of water was allowed for drinking during the hot season.

At any rate, when a *Praktikant* or graduate student got an assignment to the lying-in hospital, he reported to Professor Klein, to whom he gave a memorandum stating his name, age, place of birth, and religion. After he was enrolled, he was allotted a bed in the quarters provided for the graduate students and entered upon his service of eight weeks, working the first half of the period in the daytime, the other half at night. The *Praktikanten* worked in pairs, and each pair had about three turns at keeping the " journal " for twenty-four hours, in which the observations relative to the course of each labor were entered. They also served as admitting officers for all the patients entering the hospital during the same twenty-four hours.

The journalists took over the duties in the clinics at the end of the morning visit and were bound to remain at their post for the full day, apparently with no time out for regular meals. After the clinic visits journalists wrote the prescriptions, distributed the prepared medicines, applied leeches or vesicants, and performed venesections when necessary. In the labor-ward, they admitted the arriving gravida and examined her to determine the stage of her pregnancy, the presentation of the infant, and the presence of any disproportion between the fetal head and the pelvis. If labor was imminent, she was assigned to a bed in the labor-ward. If the patient was actually in labor, her bed was screened and she was examined vaginally as often as was thought necessary until the bag of waters ruptured. Routh said that, taking into account the morning and afternoon visits, ". . . every woman must needs be examined by some five different persons at least, and this number may be doubled or tripled." Oliver asserted that each student was sure of examining externally and *per vaginam* six to ten women each day, according to the number of parturients in the labor-ward at the time of the clinic visit. (As said before, there were twenty-four students to participate in the clinic visit.) According to the *Etiology,* if a parturient, for example, had spent three days in the labor-ward because of a protracted stage of dilatation, then she went through six clinic visits, and at every visit she was examined by at least five students; that is, at least thirty examinations altogether, not counting the many examinations she was subjected to in the intervals. In

passing, it might be mentioned that lard or some other fatty substance of dubious sterility was used during these examinations partly as a lubricant, but more for the protection of the examiner.

After the rupture of the membranes, the parturient was assigned to a pair of day or night men (*Tags- oder Nachtsherrn*) and a corresponding midwife, who then took over the conduct of the labor. In a normal labor with the head presenting and no apparent disproportion, the supervision of the case was left to the journalists. If the presentation was abnormal or it seemed that an operative intervention might be necessary, the Assistant was notified at an appropriate time. The further disposal of the case was then his responsibility. (According to a complaint made by Klein, Semmelweis was not too precipitate about disturbing the Professor's rest. Wilde stated that the Assistant in the lying-in hospital had more responsibility and more power than any of the other *Secundarii*.) If the Assistant wished to do so, he could allow a *Praktikant* to operate, provided the latter had satisfactorily completed the course in operative obstetrics.

In the normal labor, the attending *Praktikanten*, as well as the midwife, examined the patient whenever and as often as they saw fit, supported the perineum, delivered the baby, and remained on watch until the after-birth was delivered by the natural powers. After the labor was over, one or the other *Praktikant* registered the name and age of the parturient, the course of the labor, the length of the several stages, and the condition, sex, and weight of the infant. A journalist then wrote a summary of the case on a separate sheet of paper, which was sent at the appointed time to the proper office in the General Hospital.

Three hours after a normal delivery, the patient walked to her bed in the puerperal ward, while patients who had undergone an operative delivery or were weak from some other cause were carried to their beds on a litter.

Henry K. Oliver had forty or more deliveries during his turns as a journalist, several with abnormal presentations. In addition, he was present at many forceps operations, one perforation, and one Caesarean section for extreme pelvic deformity. The patient in this last instance had two convulsive seizures before operation and nine-

teen afterwards, dying within twenty-four hours, ". . . without having lost more blood than in a normal delivery, and *before peritonitis set in.*" [10]

Each time a *Praktikant* served as a journalist, he gave the housekeeper and the attendant midwives each a tip to insure better attention, and at the end of his service bestowed another small sum on the attendant in charge of the room in which the graduate students slept. This evidently was a well-established custom, because it was one of the abuses charged against Boer who tolerated it seemingly as a sort of bonus for the midwives.

The Clinic for Midwives according to Arneth was similar in arrangement to the First Division, except that the wards did not communicate directly with one another but opened directly on a long corridor which ran alongside all the wards. Consequently, the windows in one long wall of the wing did not open in the clear, but only on the hall.

This clinic had a labor-ward with seven beds, a small waiting-room with its own kitchen (the reason for a kitchen in that particular location is not stated), five lying-in wards (15, 18, 18, 20, and 22 beds), one ward for forty waiting gravidae, a sick-ward with fourteen beds, and a small ward with four beds for the care of restless or agitated patients (eclamptics, etc.).

This division had an additional feature of two lying-in wards for midwives, who up to 1848 had to be married women. The deliveries of the parturient midwives were conducted by the Chief-Midwife in this clinic, and a medical attendant was called in *only*

[10] Oliver did not put the last phrase into italics. His account of his experiences was published in 1857, eight years before antiseptic surgery began to work its way back to Vienna from England and at a time when such a complication was more the rule than the exception. Arneth tells us that in the period from 1789 to 1849 inclusive Caesarean section was performed on living parturients in five instances; once by Boer, three times by Professor Klein, once by Professor Bartsch; all of the mothers died, the infants were all born alive, and some of them remained in good health for several years. He also states that perforation was done only four times in 6,608 cases and there were no embryotomies in this group. He cites three cases in which the infants were saved by post-mortem Caesarean sections (the maternal cause of death—tuberculosis, eclampsia, and a suppurative cellulitis of the neck).

when there was serious difficulty. Routh never heard of a midwife who had been attacked by childbed fever.

Besides the Professor and the Assistant, the staff consisted of the Chief Midwife and a nurse. The pupil-midwives, all married women over eighteen and under forty years of age, had to be able to read and write and to furnish a certificate of good character from their local authorities. They were given five months of instruction in the principles of obstetrics and were then admitted in turn to two months practical training in the clinic. Every labor was attended by an older (in training) and a younger pupil-midwife, who were obligated to report the slightest deviation from the normal to the Chief-Midwife. Similarly, a senior and a junior candidate kept the journal during their twenty-four hour service and were permitted to examine all the patients who were currently in labor.

The delivery-bed in the Midwives' Clinic differed from an ordinary bed only a very little, in that it had a stitched (quilted?) straw mattress, which was covered by oilcloth, and over that was placed a coverlet and a linen sheet. The mattress itself was divided into two sections—an upper part two-thirds of its length and the other third forming the lower section, which could be readily changed when soiled.

The parturient was free to assume the posture or position that was most comfortable to her, but she was usually delivered lying on her left side, a practice presumably brought back from England by Boer. Why this lateral position was retained in the Second Division and not in the First has not been explained.

Apparently, perineal lacerations were not repaired. Arneth does not suggest a reason, but not many years had gone by since a surgeon had to be called in by the obstetrician to make such repairs.

Two pupil-midwives were required to live in turn in the ward for waiting gravidae, so that each patient would be brought to the labor-ward as soon as her pains had become established.

There were twenty to thirty less beds in the Second Clinic with usually six hundred to eleven hundred less puerperae to care for each year. With one less admission-day each week, there was supposed to be an appreciably greater amount of time to clean and air the empty wards in preparation for the new arrivals.

The conduct of the Second Clinic as a whole was much the same as in the First as far as the care of the patients was concerned.

The course in operative obstetrics, as given by Dr. Gustav Braun, was an exceedingly practical one according to Oliver, and one may safely assume that the procedure did not differ greatly in 1857 from what was done in Semmelweis' time. The necessary equipment was provided as follows: Dr. Braun provided a phantom, or manikin as it is called today,[11] the hospital a female body, and the five or six deaths daily in the Foundling Hospital a never-failing supply of infant cadavers. Johann Friedrich Osiander (1787-1855) of Göttingen set down this titbit for posterity: "In Vienna I saw female cadavers prepared as phantoms as follows: the upper part of the trunk as well as the viscera was removed, the uterus dissected out, and the cadaver of a new-born infant instead of a *Fantom-puppe*[12] was pushed or pulled through the pelvis. What a horrible business! Cold—bloody—often foul smelling . . . Who would want to practice daily on a cadaver, which could be used only a couple of times before it became unfit for use? The cadavers [infant?] were used to demonstrate operations, versions, the application of forceps, and once for perforation. Only in a city, where cadavers are to be had for a price for such purposes—we bought the heads of young, defunct grenadiers to practice ophthalmic operations on for a paper gulden each, of which thirty were equivalent to one Friedrichs d'Or [the Prussian gold mark, at that time worth about seventeen German marks]—could one conceive of such a phantom, which seemed to me to be more apt to fill a person with loathing for operative obstetrics . . ." Nevertheless, this method of instruction was required by the official Plan of Studies.

The participants in this course were allowed to perform any or all the obstetrical operations they could think of: forceps delivery, version, perforation, decapitation, and whatever else may have

[11] The phantom was a leather-covered figure, bearing some resemblance to the female human body, on which the different presentations and positions of the fetus could be demonstrated and the various mechanisms of the normal and operative deliveries simulated.

[12] A leather-covered doll, somewhat smaller than a newborn infant, used for demonstration in the obstetrical exercises on the *Fantom*.

appealed to their fancy or imagination, and as often as time would permit. The management of all abnormal presentations was demonstrated. While one student was struggling with his operation on the cadaver, the remainder of the group practiced the diagnosis of presentation and position on the manikin (whether by abdominal palpation or vaginal examination is not stated, but probably by the latter method). While the class turned its collective back, Dr. Braun placed the infant in some position or other, and then each student in turn was allowed a certain time in which to make his diagnosis. After all had completed their examinations, the Assistant quizzed each separately on his findings, giving no hint as to the correct diagnosis. When the group had been gone through, the manikin was uncovered and the actual presentation and position was revealed.

In the Midwives' Clinic, the demonstrations in operative obstetrics were made only on the manikin.

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THE BEGINNINGS OF THE PUBLIC HEALTH MOVEMENT IN THE UNITED STATES

HOWARD D. KRAMER

The first and foremost battle-field of public health reform was the modern city. Urban life in the nineteenth century, by being less favorable to health than the country, eventually forced society to conduct a rigorous self-inspection. When a horrified humanity became stirred into action by what it discovered, the city, fortunately enough, could provide through superior organization a better defense against disease and more effective means for its eradication than could rural areas.

It is not the purpose here to list the many factors that encouraged the development of great metropolitan centers in the nineteenth century. Enough to say that once the city had justified itself economically, it had another duty to perform. Sooner or later, if it were to survive, it had to make itself a safe and a healthy place to live.

Public health [1] is the name given to those measures and devices

[1] Sanitary science, which is a combination of a great number of sciences and professions, defies a precise definition. If public health is to be defined at all, it must be in terms of its ultimate purpose. Nevertheless, for the reader's reference, two definitions composed by qualified sanitarians are here given.

C.-E. A. Winslow has defined public health as "the science and the art of preventing disease, prolonging life, and promoting health and efficiency through organized community effort for the sanitation of the environment, the control of community infections, the education of the individual in principles of personal hygiene, the organization of medical and nursing service for the early diagnosis and preventive treatment of disease, and the development of the social machinery which will ensure to every individual in the community a standard of living adequate for the maintenance of health." Winslow, "The Untilled Fields of Public Health," *Science* (Cambridge, Massachusetts), n. s., LI, 1920, p. 30.

George M. Kober narrows the above definition: "The application of the precepts of hygiene . . . is generally subdivided into personal and public hygiene. In the former, the rules of hygiene are applied to individuals; in the latter, to nations or communities. . . . When the State promulgates sanitary laws or rules for the protection of its citizens, the term 'public health,' or 'state medicine,' has been chosen to designate this activity." Kober, "Progress in Health Conservation in the Last Fifty Years," *United States Public Health Reports* (Treasury Department, Washington, D. C.), XXXVIII, Part I, 1923, p. 725.

employed to achieve this vitally needed sanitary reform. Occasional laws or isolated regulations specifically designed to protect the citizens of a state from disease can be found throughout history, but not until the middle of the nineteenth century was a fully-developed, enlightened program first put into effect. Naturally enough, England led the way in public health reform. Her manufacturing cities, a consequence of her advanced industrialization, gave rise to squalid living conditions which attracted the eye, then the indignation of social reformers of the 1830's. Men imbued with the spirit of the New Humanity—Edwin Chadwick, Dr. Southwood Smith, Lord Ashley, Robert Owen—waged bitter war against poverty, misery and disease. One result of their efforts was the Public Health Act of 1848, which marks the legal birth of sanitary reform.

This English example had an effect on the United States scarcely to be overestimated. Yet it would be a mistake to say that the latter merely copied the English program. The agitation for protective health measures in America, although conforming in general to the pattern of the English movement, followed a distinct course of its own.

Before the initial step toward sanitary reform could be taken, the United States had to recognize that a sanitary problem existed. Recognition came slowly. Americans had watched with complete approval the crusade of Chadwick and others to remedy the vile living conditions of the poor in England's teeming cities.[2] The

[2] The *North American Review* in several articles referred to the Parliamentary reports disclosing the living conditions among England's working classes, as did the *Princeton Review* and others. See [H. A. Miles], "The Cotton Manufacturing System of Great Britain," *North American Review* (Boston), LII, 1841, pp. 37 *et passim*, and especially pp. 52-56 for a comparison with American manufacturing conditions; [C. C. Felton and F. Bowen], "The Morals, Manners, and Poetry of England," *ibid.*, LIX, 1844, pp. 15-22; "Report on Tenements for the Poor," *ibid.*, LXIV, 1847, pp. 266-268; [F. Bowen], "The Social Condition of England," *ibid.*, LXV, 1847, pp. 461-504; "The Poor and Poor Laws of Great Britain," *Princeton Review* (Philadelphia), Series 2, XIII, 1841, pp. 99-131; "M'Culloch's British Empire," *ibid.*, 416-450; "Chalmers on Education and Ecclesiastical Economy," *ibid.*, XIV, 1842, p. 578; [Timothy Dwight], "England and the United States:—Agriculture, Manufactures and Railroads," *The New Englander* (New Haven), VI, 1840, pp. 281-292, especially 287-288. Americans were also able to follow closely the progress of health reform abroad through the English periodicals, which had a large audience in the United States.

Report of the Poor Law Commissioners for 1840 drew from leading American periodicals searing indictments of the slum quarters in foreign lands. Aghast at the picture presented by the English report but with their gaze fixed high above what lay at their own feet, New World commentators complacently offered fervent thanks that the manufacturing classes of America had escaped the poverty and degradation of Europe.[3] Here and there some doubt was cast on the permanence of this escape—some worry lest the United States in another twenty-five years might not "exhibit some of the dreadful scenes which now sicken us when we look abroad."[4]

It was not necessary to wait so long. By 1847 the larger cities in America could duplicate many of the harrowing scenes portrayed in the Poor Law Report of 1840, a disclosure brought to light by a survey of some dozen cities conducted by the newly formed American Medical Association.[5] The amazing growth of urban centers was responsible for this new social problem. Starting about 1820 both the size and the number of American cities had increased out of all proportion to former growth; between 1820 and 1830 the number of towns of more than 8,000 inhabitants doubled in the United States, and almost doubled again in the next decade. The greatest percentage gains in urban population came in the 1840's.[6] New York grew from 300,000 to half a million, Buffalo from 18,000 to 42,000, Chicago from 5,000 to 30,000. By 1860 New York had increased its population to 800,000, Philadelphia had passed the half million mark, and six other American cities had more than 100,000 inhabitants.[7]

Such rapid growth tended to outrun the forces of law and order, and to smother under the weight of numbers any attempts at civic

[3] [Bowen], "Social Condition of England," *loc. cit.*, p. 504; *Princeton Review*, XIII, 1841, pp. 124-127, 441, 445-446; [Ralph Waldo Emerson], "The Young American," *The Dial* (Boston), April, 1844, p. 487; and see also "Social Tendencies," *The Dial*, October, 1843, p. 195, which inveighs against "ephemeral reforms" and justifies, by a typical Malthusian viewpoint, social evils.

[4] *Princeton Review*, XIII, 1841, p. 114; *ibid.*, XIV, 1842, p. 578.

[5] *American Medical Association Transactions* (Philadelphia), II, 1849, pp. 431 ff. The association was founded in 1847.

[6] Adna F. Weber, *Growth of Cities in the Nineteenth Century* (New York, 1899), pp. 22-25.

[7] Arthur M. Schlesinger, "The City in American History," *Mississippi Valley Historical Review* (Cedar Rapids, Iowa), XXVII, 1940, p. 51.

reform. Before public health measures could be adopted or enforced, other more pressing problems had to be solved. An effective police force, the first requisite of community life, did not make its appearance in the Atlantic seaboard cities until 1853, and satisfactory fire prevention came even later. Protection against the dirt and filth of human aggregation, which threatened the life of every man, woman, and child, had to wait upon the adequate enforcement of law and order.[8]

Yet the desirability of some supervision over the health of the community did not go entirely unacknowledged. Even as early as 1830 most of the larger American cities had boards of health. Measured in practical results this meant little. Usually these boards were composed of the mayor and several aldermen, and only convened when an epidemic knocked at the gates of the city.[9] When compelled by an emergency to adopt immediate sanitary regulations, the frantic activity of these boards frequently did more harm than good; the board of health was "more to be feared than the pestilence," declared an early mayor of New York, who refused to convoke it during an epidemic of cholera.[10]

Seldom if ever did these makeshift boards of health pay any attention to the living conditions responsible for endemic diseases. However, by the late 1840's the slum districts of the larger cities had become so objectionable that civic-minded citizens could no longer blindly disregard the social evil in their midst. New York at this time housed more than 18,000 persons in damp, disease-breeding cellars, and the poor of Boston, according to an accusation of the *North American Review*, were "now worse lodged than their brethren in the foulest and most crowded districts of the large cities of Europe."[11] In external appearance the poorer quarters of the typical American city presented a scene of utmost disorder, filth and confusion. Narrow, unpaved streets became transformed into quagmires when it rained. Rickety tenements, swarming with unwashed

[8] Sir Arthur Newsholme, *The Ministry of Health* (London, 1925), pp. 1-3.

[9] Richard H. Shryock, "Origins and Significance of the Public Health Movement in the United States," *Annals of Medical History* (New York), n. s., I, 1929, p. 646.

[10] Stephen Smith, *The City That Was* (New York, 1911), p. 166.

[11] *North American Review*, LXIV, 1847, p. 266.

humanity, leaned upon one another for support. Inadequate drainage systems failed to carry away sewage, and outside privies bordered almost every thoroughfare. Slaughterhouses and fertilizing plants for their part contaminated the air with an indescribable stench. Under these conditions it was not surprising that by 1850 the average span of life in Boston and other American cities was less than in London [12]—a metropolis that only a few years before had received such scorching criticism at the hands of Americans for its "sickening" scenes of misery and depravity.

As the similarities of English and American urban conditions became more pronounced, the noteworthy achievements of the English health laws did a great deal to stimulate the public health movement in the United States. Another development of the 1840's that awakened the American people to the dangerous absence of adequate sanitation in their communities was the progress made in the collection and interpretation of vital statistics.

The want of accurate mortality records was early deprecated in America. As the *North American Review* pointed out, "To know what will promote the welfare of the people, and what will be prejudicial to them, it is quite material to know the facts relative to the population." [13] Previous to 1830 the registration of births, marriages, and deaths had been left to the sextons of churches, an arrangement that did not lead to dependable results. Later, doctors lent their aid to the compilation of mortality statistics, but this brought no great improvement.[14] It was soon realized that in order to obtain accurate annual statistics the government must assume responsibility for their collection.[15]

The first move in this direction was taken by the state of Massachusetts, with the enactment of a compulsory registration law in 1842.[16] Although the first reports under the new law were far from

[12] *Ibid.*, p. 267.

[13] [W. Phillips], "Registration Law in Massachusetts," *North American Review*, LXI, 1845, pp. 250-253, especially 252.

[14] Shryock, "Origins and Significance of Public Health Movement," *loc. cit.*, p. 646.

[15] [Phillips], "Registration Law," *loc. cit.*, pp. 250-253.

[16] This law was passed at the request of the American Statistical Association and the American Academy of Sciences.

perfect, each year saw an appreciable gain in their accuracy.[17] Unhappily, with the exception of New York, other states were slow to follow this example.[18] Municipal governments had more success. Four large cities, New York, Boston, Philadelphia, and New Orleans, had been keeping a record of their annual death rate since 1815, but the figures for the early years were mostly in the nature of rough estimations. Strangely enough, business, so often the *bête noire* of reform, contributed nearly as much as government toward raising the standards of accuracy; the advent of insurance companies in America a few years before the half century mark and their astonishing popularity in the decade before the Civil War led to considerable refinement in the interpretation of vital statistics.[19]

[17] [Phillips], "Registration Law," *loc. cit.*, p. 251; also, *American Medical Association Transactions*, I, 1848, p. 487.

[18] *American Medical Association Transactions*, I, pp. 339-340. Because of defects in the New York registration law it soon became "to all intents inoperative." See "Report of the Sanitary Commission of Massachusetts," *Buffalo Medical Journal* (Buffalo), VI, 1850-1851, p. 601.

[19] One of the first findings of these insurance companies showed that sickness and mortality did not necessarily have a direct correlation, which was commonly assumed by public health agitators of that day. See "The Law of Sickness, and Its Application to Health Insurance and Benefit Societies," *Hunt's Merchants' Magazine and Commercial Review* (New York), XIX, 1848, p. 605. Although health insurance of a sort had been introduced into America before 1840 through means of benevolent societies, the public did not really become insurance-conscious until the establishment of commercial companies, beginning about 1843. Then the practice of insuring one's life spread so rapidly that by 1856 the editor of *Hunt's Merchants' Magazine* devoted considerable space to discussing the question, "Does a Man Shorten His Life by Insuring It?" The main objection to life insurance appeared to be that "the lives of persons insured were frequently tampered with. They were encouraged to dissipation, drink, and the means of procuring drink were constantly placed within their reach, and there had been cases of men whose lives were insured, who had been *urged to ride steeple chases* by persons to whom their policies had been assigned." *Ibid.*, XXV, 1856, p. 110. It is a revealing commentary on the discredited status of the medical profession of that day that all insurance companies, without exception it seems, refused to insure the wives of surgeons! *Ibid.* For a full account of the contributions made by insurance companies to the collection and tabulation of vital statistics, see Frederick L. Hoffman, "American Mortality Progress during the Last Half Century," in Mazyck P. Ravenel, ed., *A Half Century of Public Health* (New York, 1921), pp. 94-117; also, "Responsibility of Government for the Public Health," *National Quarterly Review* (New York), XXVIII, 1873, p. 30.

Despite this progress, the mortality figures for the nation as a whole were fragmentary and contained glaring discrepancies.

Crude as these records were, they nevertheless served to show an alarming increase in the death rate of American cities during the first half of the nineteenth century. In 1810 only one out of every 46 persons died annually in New York; by 1859 this had increased to one out of every 27 inhabitants.[20] The mortality of Boston, New York, and other large American coastal cities had begun to exceed that of London by 1850.[21]

Here was an unmistakable signpost pointing to the need for public reform. This warning stirred into action a small group of men who believed that "vital statistics are the actual sanitary history of a community."[22] In 1849 the Massachusetts Medical Society, with the support of the American Statistical Association, prevailed upon the state legislature to finance a committee of three to draw up a plan for a sanitary survey of Massachusetts.[23] Lemuel Shattuck was appointed chairman of the committee.

Shattuck proved an excellent choice.[24] He was well qualified to

[20] Shryock, "Origins and Significance of Public Health Movement," *loc. cit.*, pp. 657-658; Smith, *The City That Was*, pp. 120-122.

[21] "Health: New York versus London," *Hunt's Merchants' Magazine*, XLVIII, 1863, pp. 120-124, especially 123; also *North American Review*, LXIV, 1847, p. 267.

[22] [E. H. Clarke], "Sanitary Reform," *North American Review*, LXXIII, 1851, pp. 117-135, especially 118.

[23] *American Medical Association Transactions*, II, 1849, p. 487. The governor appointed Lemuel Shattuck, of Boston; Dr. Heheil Abbott, of Westfield; and Nathaniel P. Banks, of Waltham, as the commissioners. E[dward] J[arvis], "Report of the Sanitary Commission of Massachusetts," *Boston Medical and Surgical Journal* (Boston), XLIV, 1851, p. 90. Contemporaneous with this survey, Daniel Drake was making a geomedical survey "to blue-print the geographical pathology of the Middle West at a time when sanitation, as we understand it, was unknown." For the influence of Drake's work on John Shaw Billings and other future sanitarians, see Fielding H. Garrison, "Geomedicine: A Science in Gestation," *Bulletin of the Institute of the History of Medicine* (Baltimore), I, 1933, pp. 2-9, especially 4.

[24] Lemuel Shattuck was born on October 12, 1793, and died in November, 1859. For brief accounts of his life and career, see Allen Johnson and Dumas Malone, eds., *Dictionary of American Biography* (New York, 1928-1936), XVII, pp. 33-34 (hereinafter cited as *D. A. B.*); M. E. M. Walker, *Pioneers of Public Health: The Story of Some Benefactors of the Human Race* (New York, 1930), pp. 59-70; Charles Hudson, "Memoir of Lemuel Shattuck," *Proceedings of the Massachusetts*

conduct such an investigation. His life had been one of diversified activity; in turn he had been teacher, historian, businessman, statistician, and finally a legislator in the state assembly. Although a layman in medical matters, he was a student of sanitary reform, his interest in the subject having been aroused when gathering and tabulating the vital statistics of Boston. Aided by the cooperation of medical men throughout the state, the committee finished its work quickly and submitted its findings to the legislature in 1850.[25]

This report is justly famous as the first concrete plan for an integrated state program of public health in the United States. Sensible in its suggestions, modern in its tone, it stands as a monument to the perspicacity of Lemuel Shattuck who was its sole author.[26] By virtue of this document Shattuck fully deserves his place at the head of early American sanitarians.

In the 130 some pages devoted to planning the sanitary survey, the necessity for health reform was clearly set forth. Basing his opinion on the unsanitary conditions prevailing throughout the state as reported by medical men, Shattuck estimated that nearly 50 per cent of all deaths were unnecessary, and that these fatalities resulted from environmental factors that society could amend or eliminate. The best solution for this high death rate was "prevention rather than cure." The physician, once disease had appeared, could only mitigate and alleviate the seriousness of the illness—cure depended mostly upon nature and the constitution of the person attacked. Shattuck, the layman in medicine, was not alone in his loss of faith in the physician's power to heal; the doctors themselves, in their more candid moments, voiced the same discouragement regarding the efficacy of curative medicine.[27] Therefore, the constructive health

Historical Society (Boston), XVIII, 1880, pp. 155-165; for a portrait, see George C. Whipple, *State Sanitation* (2 vols., Cambridge, Massachusetts, 1917), I, p. 185.

[26] *Report of a General Plan for the Promotion of Public and Personal Health, Devised, Prepared and Recommended by the Commissioners appointed under a Resolve of the Legislature of Massachusetts, relating to a Sanitary Survey of the State* (Boston, 1850). The more important sections of this report are reprinted in Whipple, *State Sanitation*, I.

[26] All authorities are in agreement that the report was the handiwork of Shattuck alone. For a statement to this effect at the time the report was issued, see E[dward] J[arvis], "Report of Sanitary Commission," *loc. cit.*, p. 90.

[27] Others beside Shattuck stressed the point that "prevention rather than cure"

proposals in this plan for state sanitation contained little of a medical nature, but instead stressed the desirability of changing the environment in which people lived.

Shattuck advanced an essentially simple and very practical method for administering his program.[28] The state need only create a board of health with wide powers of supervision, and each community could then handle its own local sanitation problems under the direct supervision of this superior board. As an example of the modernity of his suggestions, Shattuck advised that this work be put into the hands of specially trained "sanitarians."[29] He also pointed out the advisability of employing full time, well-paid local health officers, rather than depending upon voluntary help.

Instead of outlining in detail all the duties of this state health board, Shattuck listed some fifty purposes that could be served by state medicine, leaving to the legislature the choice of which goals to pursue. Matters of water supply, sewage, ventilation, vital statistics, standardization of causes of death in physicians' reports, burial grounds, street cleaning, garbage disposal, drainage of bogs and swampy ground, housing and plumbing requirements, and isolation of contagious cases made up the greater portion of these suggestions. It speaks well of the foresight of Shattuck that all his suggested reforms, practically without exception, became incorporated into future health programs at one time or another. But is it fair to say, by the same reasoning, that it reflects disparagingly upon his fellow citizens that the plan was not adopted? Why did the report, as it were, drop "stillborn from the State Printer's hands"?[30]

provided the best solution. See [Clarke], "Sanitary Commission," *loc. cit.*, pp. 133-134. As an instance of the loss of faith in the effectiveness of medical treatment in those days, see the address by Oliver Wendell Holmes read before the Massachusetts Medical Society, May 30, 1860. *The Complete Writings of Oliver Wendell Holmes* (13 vols., Boston, 1892), IX, pp. 173-208.

[28] For an excellent brief summary of the proposed method of administering the plan, see E[dward] J[arvis], "Report of Sanitary Commission," *loc. cit.*, pp. 91-96.

[29] Shattuck also advocated the founding of sanitary professorships in American colleges, for "the science of preserving health and preventing diseases should be taught as one of the most important sciences." *Report of the Massachusetts Sanitary Commission*, p. 229.

[30] Henry I. Bowditch, *Public Hygiene in America: Being the Centennial Discourse delivered before the International Medical Congress, Philadelphia, September, 1876* (Boston, 1877), p. 31.

Certainly it cannot be asserted that Shattuck neglected in his report to advance cogent arguments for the adoption of his program. He appended a list of well-presented reasons for adopting the plan, and a section devoted to answering expected objections to his proposals.[81] He took particular pains to emphasize the economic advantages to be gained from improved sanitation, realizing that from this quarter would come some of the strongest resistance to his plan.[82] He also displayed concern lest the program arouse the opposition of the medical fraternity, especially certain selfish elements who would object because of mercenary considerations. It was pointed out that state medicine would help the physician "by giving him exact knowledge of the causes and prevalence of disease" upon which "he might construct a much better theory of medicine." But primarily Shattuck stressed the wisdom of eliminating the causes of the diseases of society as "the greatest and the most important objects of philanthropy and charity," and he subscribed to the belief, as first expressed by the famous English sanitarian, Sir John Simon, that sanitary science, "in its beneficient operation, seems to embody the spirit and to fulfill the intentions of practical Christianity." Unfortunately, while "the history of the health of the people should be regarded as the most important part of history," it has usually been considered "an incidental matter of little consequence."[83] It was Shattuck's hope that such indifference would now become a thing of the past.

That hope did not materialize. The public evinced no signs of shaking off its habitual apathy toward health reform. Another twenty years was to pass before a state health program modelled after the Shattuck plan found acceptance in Massachusetts.

The explanation for the failure of the 1850 report must take into account several things. Admitting the worth and reasonableness of the plan, the public of that day should not be blamed too severely for their continued indifference, for "the first and greatest need of any reform movement is to spread knowledge of the evils it is desired to cure."[84] This had not been done. Knowledge of the

[81] *Report of the Massachusetts Sanitary Commission*, pp. 241-297.
[82] *Ibid.*, pp. 254-262.
[83] *Ibid.*, pp. 253, 266, 12, and 81, respectively.
[84] B. Leigh Hutchins, *Public Health Agitation, 1832-1848* (London, 1909), p. 97.

living conditions of the poorer classes is what very few people possessed at that time, and the report of 1850 did not give them this information. It did not shock them into awareness of the grave social evil in their midst, as had its earlier English counterpart. Chadwick had enlisted the compassion of the English people by presenting actual case studies and specific evidence concerning the debasing surroundings and homes forced on the poor by a new, emerging industrial civilization. In contrast, the Shattuck report appealed to the mind rather than to the heart.

Nor did the periodical literature of the day abound in articles on slum conditions in American cities.[85] Other reforms held the center of the stage. An imposing array of public questions—slavery, temperance, women's rights, prison reform, treatment of the insane, cruelty to animals—monopolized the nation's interest. There was little room left in such a crowded forum for sanitary reform, even though it be, according to the *North American Review*, one of the most important reforms of the century.[86]

Furthermore, if the restrictive economic measures necessary for carrying out health reform are kept in mind, this public apathy becomes even more understandable. The recommendation " that tenements for the better accommodation of the poor, be erected in cities and villages " was certain to intrude upon the prized liberties and rights of the individual property holder. By emphasizing such environmental factors of sanitary reform the average citizen was given an opportunity to protest: " This measure will interfere with private rights. If I own an estate hav'n't I a right to do with it as I please? " [87] It is no surprise, therefore, that other reforms proved more popular. Temperance, women's rights, prison reform—there was nothing incommodious about these movements, nothing that imposed restrictions on one's freedom to do with his property what he wished. But sanitary measures based on the belief that " filth " alone caused disease meant the destruction of highly profitable tenements and the embarrassment of large assessments to construct drains

[85] American periodicals, while printing occasional articles touching on this subject, did not feature the insanitary conditions of their cities as did the English.

[86] [Clarke], " Sanitary Commission," *loc. cit.*, p. 118.

[87] *Report of the Massachusetts Sanitary Commission*, pp. 207-209, 286.

and sewers. For "filth" then, as sometimes today, paid out high dividends, and the human race being what it is, profits often in the short run prevail over principles. That is one important reason that housing reform has lagged behind other humanitarian efforts. Furthermore, Shattuck's day was a time when moral and religious judgments were all-important, when man's soul was thought to have little or no connection with his physical well-being.[38]

In 1850 the shadow of the slavery controversy lay over the whole nation.[39] Men's minds were becoming absorbed by a sectional dispute which threatened the security of the union. A state program concerning sanitary reform could expect to receive but imperfect consideration when competing with this issue. As a matter of fact, the Shattuck plan never came before the Massachusetts legislature for debate. Yet public health reform in America, by the very nature of the government and its relationship to the states, had to pass through the crucible of local control before qualifying as a national question. It had to proceed from the smaller unit to the larger.[40] England, with its compact territory and its centralized government, could cut the Gordian knot of sanitation reform at one stroke. Not so the United States. When the Massachusetts survey dropped from sight, America had to wait until after the great national issue of the nineteenth century was definitely settled before another state program was devised and then adopted.

And finally, a measure of responsibility for the plan's quick demise must fall upon its author. Not that Shattuck's sincerity, or his devotion to the cause of state medicine, can ever be called into question. To arrest such thoughts one has only to read his testament of faith in respect to sanitation:

[38] Frank D. Watson, *The Charity Organization Movement in the United States* (New York, 1922), p. 77.

[39] The slavery issue was possibly one reason why the degrading conditions of the working classes in America's cities were not attacked in the periodicals of the day. The southern supporters of slavery were only too anxious to seize upon any evidence that would bolster their argument that "wage slavery" was worse than actual bondage. As the dispute became more and more acrimonious, the North, naturally, was reluctant to expose conditions that would bear out this southern point of view.

[40] Samuel W. Abbott, *Past and Present Condition of Public Hygiene and Medicine in the United States* (Boston, 1900), p. 11.

> We believe that the conditions of perfect health, either public or personal, are seldom or never attained, though attainable; that the average length of life may be very much extended; . . . that in every year within this Commonwealth, thousands of lives are lost which might have been saved; that tens of thousands of cases of sickness occur, which might have been prevented; that these preventable evils . . . impose upon the people unnumbered and immeasurable calamities, pecuniary, social, physical, mental and moral, which might be avoided; that means exist, within our reach, for their mitigation or removal; . . . and that measures for prevention will effect infinitely more, than remedies for the cure of disease . . . . What . . . can come up for consideration that shall transcend [sanitation] in importance? When compared together, all other matters this side the grave dwindle into insignificance.[41]

Words, however, were not enough. Deeds were also required. Unhappily, Shattuck did not possess the temperament of a Chadwick. He could not lead a prolonged crusade, nor could he fight on with undaunted perseverance as did the Englishman. He lacked the inner fire which drove Chadwick to devote his life to studying slums and fevers, to inspecting drains and sewers.

One should not be harsh in judging Shattuck. He was not a young man, but on the threshold of old age. His first and last love had always been vital statistics; it was to this field of study that he again turned when his plan for state medicine did not reach fruition.

Thus, the report of 1850 accomplished nothing concrete. It failed despite public knowledge of the splendid results experienced in England under a similar plan, and despite the ominous threat of cholera in 1850 which, by all the rules of public behavior in response to an epidemic, should have created popular support for health reform. Even in failure, however, the report was significant as an indication of a critical attitude by more progressive citizens toward existing health conditions, and of a new concern for the immediate public health problems of American society.

In the short, crowded years between 1850 and the outbreak of the Civil War, Americans began to acquire a quickening interest in health matters, especially personal hygiene. How to achieve physical fitness became a popular topic of discussion, and one that the magazines of the day consistently exploited.[42]

[41] *Report of the Massachusetts Sanitary Commission*, p. 10.

[42] The American physiognomy as disparagingly compared to that of Europe

Unflattering descriptions of the American populace by foreign visitors had a great deal to do with this rising concern regarding physical fitness. It would not be too much to say that after 1830 no European traveller to the United States ever forgot to insert somewhere in his published comments on America a few disparaging remarks about the physical appearance of the people.[43] Americans, basking in their own self-approval, found it difficult at first to believe such harsh things about themselves; for a long time they considered these unfriendly comments as based on spiteful envy, or at best, on an unreasoned prejudice. About 1850, however, the nation as a whole began to realize that something was wrong with the general condition of its health, that these unkind criticisms on the part of foreign observers had a basis in fact.

Critics at home soon began to express more and more alarm at the disgraceful prevalence of physical defects and blemishes among this new breed of men in the New World. A few caustic tongues put the blame on the softening and debilitating effects of modern civilization—a way of life which, they insisted, was solely to blame for the disturbing physical decline they saw about them.[44] More thoughtful critics defended existing society, pointing out that civilization, rather than decreasing virility, offered increasing opportunities—as yet undeveloped, to be sure—for improving the well-being of its members.[45] All these voices, regardless of what factors they

started a sharp controversy that drew attention to the desirability and need of personal hygiene in America. See [D. A. Wasson], "The New World and the New Man," *Atlantic Monthly* (Boston), II, 1858, pp. 512-531, especially 521.

[43] For typical criticisms see Allan Nevins, *American Social History as Recorded by British Travellers* (New York, 1923), pp. 250-251, 279-280, 289, 302, 312, *et passim*.

[44] Perhaps the best statement of this viewpoint came from Ralph Waldo Emerson: "What a contrast between the well-clad, reading, writing, thinking American, with a watch, a pencil, and a bill of exchange in his pocket, and the naked New Zealander, whose property is a club, a spear, a mat, and the undivided twentieth part of a shed to sleep under! But compare the health of the two men, and you shall see that his aboriginal strength the white man has lost. If the Traveller tell us truly, strike the savage with a broad-axe, and in a day or two the flesh shall unite and heal as if you struck the blow into soft pitch; and the same blow shall send the white man to his grave." Quoted in [T. W. Higginson], "Barbarism and Civilization," *Atlantic Monthly*, VII, 1861, p. 52.

[45] *Ibid.*, pp. 51-61; [A. N. Bell], "Civilization and Health," *Harper's Monthly*

blamed for the physical shortcomings of the average American, were agreed that the health of the nation was sadly deficient when compared with that of other lands.[46]

In the battle of words that followed no part of the American anatomy escaped censure. The Young America of the 1850's, according to *Harper's Monthly*, was "a pale pasty-faced, narrow-chested, spindle-shanked, dwarfed race."[47] And at the foot of this unprepossessing race of men belonged the college graduates— poor creatures who by reason of too much studying and too little exercise possessed "unstrung and dilapidated systems."[48] Perhaps the most universal symptom of this physical decay was the condition of America's teeth; one seldom talked to a dentist, it was affirmed, who did not despair of the republic.[49] That these accusations were supported by factual evidence was proved when the War Department, in 1856, published its report on the recruits examined during the Mexican War. Not only did American volunteers weigh less than European or English recruits, but there were also nearly twice as many rejections of Americans for being "too slender, and not sufficiently robust," or for "malformed and contracted chests."[50]

But the men of America were not the sole target of these jeremiads. The health of the average woman presented an even darker picture. "In this country," one anguished male lamented, "it is scarcely an exaggeration to say that every man grows to maturity surrounded by a circle of invalid relatives, that he later finds himself the husband of an invalid wife and the parent of invalid daughters,

(New York), XVI, 1857, pp. 635-637; [T. W. Higginson], "Saints and Their Bodies," *Atlantic Monthly*, I, 1858, pp. 588, *et passim*.

[46] [Higginson], "Saints and Their Bodies," *loc. cit.*, pp. 586-587.

[47] [Robert Tomes], "Why We Get Sick," *Harper's Monthly*, XIII, 1856, pp. 642-647, especially 646. See also [Samuel Osgood], "Our Sons," *ibid.*, XVII, 1858, pp. 57-62, and [Oliver Wendell Holmes], "The Autocrat of the Breakfast-Table," *Atlantic Monthly*, I, 1858, p. 881.

[48] [A. A. Livermore], "Gymnastics," *North American Review*, LXXXI, 1855, p. 66.

[49] [Higginson], "Barbarism and Civilization," *loc. cit.*, p. 56.

[50] *Statistical Report on the Sickness and Mortality in the Army of the United States, compiled from the Records of the Surgeon General's Office; embracing a Period of Sixteen Years, from January, 1839, to January 1855, in Senate Executive Documents*, 34 Cong., 1 Sess., 1855-1856, Doc. No. 96, p. 629.

and that he comes at last to regard invalidism . . . the normal condition of that sex—as if Almighty God did not know how to create a woman." [51] This of course, the writer concluded, spreads a gloom over life. The fact that in all the vast female acquaintanceship of the Beecher family there were not a dozen healthy women bears out the fairness of the above accusation.[52] One of the more momentous health problems of the day, it quickly became recognized, was to secure for American women the proper physical advantages of civilization.

Most alarming of all, certainly, was the chronic sickliness of American youngsters. The physical deficiencies of the nation were nowhere more clearly marked than among the children. A teacher in Canada in 1850, for instance, could readily tell which children in her school were born in the United States "by their invariable appearance of ill-health joined with intellectual precocity." [53] And as late as 1866 *Harper's Weekly* was still inveighing against a school system that stunted the bodies of children at the same time it overtaxed their minds.[54]

What was America to do? An almost unanimous answer to this question was found not in public health measures but in encouraging the practice of personal hygiene. Here agreement stopped and discord began. The subject of physical fitness provided a spacious rostrum from which every type of health theory or fad could contest for public favor.[55]

[51] [Higginson], "Barbarism and Civilization," *loc. cit.*, p. 60.

[52] [Higginson], "Saints and Their Bodies," *loc. cit.*, p. 586; also [Robert Tomes], "Wanted—A Healthy Wife," *Harper's Monthly*, XIII, 1856, p. 76.

[53] [Higginson], "Saints and Their Bodies," *loc. cit.*, p. 586.

[54] See for example *Harper's Weekly* (New York), X, 1866, p. 451, also pp. 163, 483, 515; and James Parton, "Chicago," *Atlantic Monthly*, XIX, 1867, p. 341.

[55] "Report of the Committee on Hygiene," *American Medical Association Transactions*, IV, 1851, p. 543; [Higginson], "Saints and Their Bodies," *loc. cit.*, 587; *The Complete Writings of Oliver Wendell Holmes*, IX, preface, *et passim*; Richard H. Shryock, *The Development of Modern Medicine: An Interpretation of the Social and Scientific Factors Involved* (Philadelphia, 1936), pp. 241-264. Foreigners found this "extraordinary appetite for quack medicines" very much in evidence. Nevins, *American Social History as Recorded by British Travellers*, p. 289. The great number of quasi-medical journals established in the decade 1850-1860 owed their existence to this search by Americans for panaceas and

In the main, the necessity of more exercise and suitable outdoor pastimes was emphasized. That health was possible to Americans ought not to be questioned, one advocate of physical culture solemnly assured his audience.[56] The superior physical condition of the Canadian people, largely a result of their love of athletic sports and outdoor life, was often held up as an example of what could be done, by the widespread practice of personal hygiene, to improve the general health of the United States.[57] The typical American, however abject his condition, worked too hard and played too little. What truly national sport do we have, tartly asked *Harper's Monthly*, unless it be " that of heating ourselves into excitement, and cheering our animal spirits by the burning embers of a neighbor's house." [58]

By the end of the decade the campaign for greater participation in sports and exercises had begun to show results. The introduction of the German Turner societies shortly after 1848 stimulated gymnastics, a form of physical culture that enjoyed a growing popularity throughout the 1850's and 1860's.[59] Gains were made on other fronts, and no wonder. From the pulpits ministers pleaded the cause of amusements and games; in the magazines writers celebrated the uses and urged the necessity of sports and outdoor recreations; and even the New York *Tribune* contributed its share by campaigning lustily for a reform in American cookery. In truth, the United States had become at last a nation of health-hunters—the want betrayed by the search.[60]

From a public health viewpoint this search failed to touch on the real problem. Proceeding as it did along individualistic lines, whatever benefits resulted would not—could not, in fact—accrue to that class which most needed help. It is true that " where sport is pur-

cure-alls. Frank Luther Mott, *A History of American Magazines* (3 vols., Cambridge, Massachusetts, 1938), II, p. 87.

[56] [Wasson], " The New World and the New Man," *loc. cit.*, p. 529.

[57] [Higginson], " Saints and Their Bodies," *loc. cit.*, p. 586.

[58] [Robert Tomes], " Are We a Happy People? " *Harper's Monthly*, XIV, 1857, p. 208. America's interest in sport did not develop fully until after the Civil War. Before that time very little attention was paid to sports in which the general public could take part. Mott, *American Magazines*, II, p. 201.

[59] Arthur C. Cole, *The Irrepressible Conflict, 1850-1865* (New York, 1934), pp. 193-194.

[60] [Wasson], " The New World and the New Man," *loc. cit.*, p. 529.

sued seriously, important conditions for personal hygiene are obtained"; one reason that England led in public health is because sport was an integral component of English education.[61] But this touched only the well-to-do. In America in the 1850's the children of the rich stood "twice the chance of life that is given the children of the poor,"[62] and the very common notion "that the privations and discomforts of poverty are at least compensated by health" was becoming recognized as an evil fallacy.[63] The poor were left to the mercy of popular nostrums and drugs, to the quacks who multiplied tenfold as the nation concentrated more and more attention on personal hygiene, or, perhaps more mercifully, to quick death in a disease-ridden environment.

To turn this popular enthusiasm for health into channels of sanitary reform should have been the duty of the medical profession. Public health, although a movement in which the layman can helpfully participate, is nevertheless a medical problem and depends primarily upon medical advice for effectiveness. Unfortunately the prestige of medicine in the 1850's was at low ebb, and the ranks of the profession were disorganized. The doctors were victims of their own want of knowledge, of the absence of adequate medical standards, and of a chaotic educational system. Many of their number, by promising too much to their patients, had brought discredit on the entire profession.[64] Leading physicians were only too aware of the low state to which the profession had sunk. As Oliver Wendell Holmes so graphically put it, "if the whole materia medica, *as now used*, could be sunk to the bottom of the sea, it would be all the

[61] Henry E. Sigerist, "The Philosophy of Hygiene," *Bulletin of the Institute of the History of Medicine*, I, 1933, p. 330.

[62] "The Health Physician's Fourth Annual Report of the City of Buffalo for 1857," *Buffalo Medical Journal*, XIII, 1857-1858, p. 700.

[63] Letter of the Committee of the Massachusetts Medical Society to Lemuel Shattuck, December 10, 1849, in *Report of the Massachusetts Sanitary Commission*, p. 357.

[64] [A. P. Peabody], "Jacob Bigelow's *Nature in Disease*," *North American Review*, LXXX, 1855, pp. 459-479, especially 472; "The Past and Present State of the Medical Profession—Homeopathy," *Boston Medical and Surgical Journal*, XLIV, 1851, pp. 338-341; "Position of the Medical Profession," *Missouri Medical and Surgical Journal* (St. Louis), II, 1847, pp. 246-248; "Past and Present," *American Medical Times*, I, 1860, pp. 334-335.

better for mankind,—and all the worse for the fishes." [65] Medicine first had to put its own house in order; not until this was done was the profession in a position to assume leadership of a comprehensive public health program.

The American Medical Association, to be sure, when first organized had appointed a committee on public hygiene and had indeed worked hard to further the Shattuck proposals in Massachusetts. But as soon as this plan failed the Association seemed to lose all interest in public health reform; the Committee on Public Hygiene submitted annual reports the first four years after the organization was founded (1847), a further brief report on sanitary police in 1856, after that came silence.[66]

Not until 1858 did the medical profession as a whole once more turn clinical eyes on the internal sanitary problem of the nation. This renewed attention to public health came principally through the efforts of Dr. John Wilson Jewell, a member of Philadelphia's Board of Health.[67] The quarantine laws of the time were in chaotic condition, for each seaport devised its own code, based on the prevailing whim or prejudice of its leading physicians. Jewell recognized the desirability and advantages of uniform quarantine regulations throughout the entire nation, and as early as 1851 advocated that a sanitary convention be called to investigate conflicting theories, adjust discrepant "facts," and clear away the rubbish of error, superstition, and prejudice behind many quarantine rules.

[65] Holmes, *Writings*, IX, p. 203. The medical profession in general protested against the extravagance of Holmes' language. See *Boston Medical and Surgical Journal*, LXI, 1860, pp. 513-514.

[66] *American Medical Association Transactions*, I, 1848, pp. 304-310; II, 1849, pp. 431-654; III, 1850, pp. 223-246; IV, 1851, pp. 517-546; IX, 1856, pp. 431-481.

[67] Jewell (1780-1867) was born in Philadelphia and graduated from the University of Pennsylvania medical college in 1824. He spent four years as medical officer on a packet ship, then returned home. He became active in the Philadelphia County Medical Society soon afterwards. Early in his career he began to devote his attention to the vital statistics of his city, and helped to frame legislation for the registration of births, marriages and deaths. Jewell was president of his city's board of health. Tall and portly, he was a man of positive opinions. He possessed a strong sense of duty and an indomitable perseverance. Howard A. Kelly and Walter L. Burrage, eds., *Dictionary of American Medical Biography; Lives of Eminent Physicians of the United States and Canada, From the Earliest Times* (New York, 1928), p. 662.

When Jewell first broached his plan to several of his colleagues he received nothing but discouragement.[68] Without exception they advised him that the reform he proposed was too difficult an undertaking to meet with success. The accomplishments of the European sanitary conventions in Paris in 1851 and 1852 convinced Jewell, however, that the task of reforming quarantine practices in America was not impossible if a meeting of health officials could be arranged. He finally interested the New York Board of Health in his proposals, and this body in 1856 issued invitations to the boards of health, the boards of trade, and the medical societies of the Atlantic seaboard cities to assemble in convention at Philadelphia on May 13, 1857.[69]

Seventy-three delegates, representing some twenty-three organizations from nine states, composed this first sanitary convention. The assembly, called primarily to consider the quarantine regulations, soon decided to extend the scope of its future activities to include internal hygiene. The following year, when the convention met in Baltimore, a Committee on the Sanitary Arrangements for Cities was appointed for the express purpose of drawing up a code of public health measures.[70]

The report of this committee was placed before the Third National Quarantine and Sanitary Convention, which convened at New York on April 27, 1859. A substantial majority of the delegates were medical men, and they selected for president of the convention one of their number, Dr. John H. Griscom of New York.[71]

[68] *Proceedings and Debates of the Third National Quarantine and Sanitary Convention, Held in the City of New York, April 27th, 28th, 29th, and 30th, 1859* (New York, 1859), p. 4.

[69] *Ibid.*, p. 5.

[70] *Ibid.*, pp. 86-87.

[71] Griscom (1809-1874) was of Quaker ancestry. He attended Rutgers medical College and the University of Pennsylvania Medical school. He was appointed physician to the New York Dispensary in 1834, and served as professor of chemistry in the New York College of Pharmacy from 1836 to 1838. In 1842 he was made City Health Inspector, then head of the health department. Before he was replaced for political reasons, he succeeded in passing an ordinance prohibiting the removal of the dead without permission of the City Inspector. This law, rigidly enforced, made mortality statistics for New York more reliable. Dr. Griscom issued annual pamphlets on the difficulties of sanitarians, published

The new president was a member of the recently organized Sanitary Association of New York, founded for the sole purpose of advancing public health regulations in New York City.

A pronounced shift in emphasis within the convention was immediately noticeable. Formerly quarantine matters had largely monopolized the deliberations. Now internal sanitary conditions held the spotlight. In his opening address Griscom stressed the fact that in the past twenty-five years his city had lost by preventable diseases more than 60,000 persons, while from yellow fever, which can be excluded by quarantine devices, a loss of less than 600 had been suffered in fifty years. These figures, in Griscom's opinion, correctly indicated the relative importance of the two divisions of hygiene that the convention had before it for consideration.[72]

Fully half of the sessions of the four-day meeting were devoted to discussing a civic sanitary code that had been compiled by Dr. Henry G. Clark of Boston, a member of the Committee on the Sanitary Arrangements for Cities.[73] Based mainly on the code drawn up by the Central Board of Health in England, it proposed methods for improving sewerage systems, water supplies, ventilation, and public parks, and for regulating and supervising house construction, markets, slaughterhouses, and interment of the dead. The state governments were petitioned to create state boards of health and to endow them with the authority to apply this code and to force its sanitary regulations upon recalcitrant communities.[74]

During the years since 1850 a few cities—notably Boston, Provi-

a report on "The Sanitary Condition of the Laboring Population of New York, with Suggestions for its Improvement," and championed the cause of the immigrant. He also invented a device for ventilating houses. An active, passionate sanitarian, he fought determinedly against politicians and the moneyed interests for control over the sanitary condition of New York City. Kelly and Burrage, eds., *Dictionary of American Medical Biography*, pp. 501-502.

[72] *Proceedings of the Third Sanitary Convention*, p. 17.

[73] Clark was city physician of Boston for many years. A prominent citizen, his office was located at 18 Beacon Street for years, then at 35 Mt. Vernon Street. *Boston Directory, 1870* and *1876*; Justin Winsor, ed., *Memorial History of Boston, including Suffolk County, Massachusetts, 1630-1880* (4 vols., Boston, 1880), II, p. 548.

[74] The proposed sanitary code is printed in full in *Proceedings of the Third Sanitary Convention*, pp. 645-674.

dence, Philadelphia, and Baltimore—had put into practice many of the sanitary suggestions included in the code, and the result had been a slight decline in their death rate.[75] In these particular cities, however, there had been no radical change in their sanitary laws; what health gains they could boast they owed to the efforts and persistence of outstanding individuals serving on their health boards. As an example of what a forceful, hard-working sanitarian could accomplish despite indifference and inadequate health laws, it is instructive to examine how one of those early health boards operated. At the Third Sanitary Convention in 1859, Dr. William M. Kemp of Baltimore [76] described in detail the method used by the Baltimore health board to control the internal hygiene of that city.

Complete responsibility for the sanitary condition of Baltimore rested squarely on the shoulders of a three-man board of health, all of the members being physicians. Periodically these officials conducted a sanitary survey of the city. To aid them in this task the mayor placed a number of policemen at their disposal. When one of these special policemen noticed a condition of uncleanliness or any hazard to health upon a premise he filed a report with the board of health, which in its turn investigated further. If the charges were borne out, the offending householder or landlord was commanded to remedy the objectionable condition at once. To enforce its dictates, the board was empowered by the municipal authorities to levy fines if its orders were not carried out promptly. If a citizen proved stubborn and continued to tolerate unsanitary conditions on his premises, the board could correct the abuses itself and charge the expense to the property owner. Without exception, in Kemp's experience, the mayor had always supported the rulings of the board when any indi-

[75] *Ibid.*, pp. 106-108, 114, 123.

[76] Kemp was born on February 21, 1811, in Frederick County, Maryland. He graduated from the University of Pennsylvania medical college in 1834, and settled in Baltimore. He was president of the board of health from 1855 to 1861. During the yellow fever epidemic of 1855, Dr. Kemp, who was convinced that the disease was non-contagious, dispensed with all quarantine regulations for the city. Although bitterly criticized at the time, the outcome fully justified his stand. He was appointed president of the second sanitary convention, which met in Baltimore in 1858. William B. Atkinson, ed., *A Biographical Dictionary of Contemporary American Physicians and Surgeons* (Philadelphia, 1880), pp. 295-296.

vidual had complained to the city government. Also, when the city was threatened by an epidemic, the mayor had turned to the board of health and given it a free hand in installing any health measures it deemed necessary to protect the city.[77]

Such a loosely organized health system could only work effectively when the utmost trust and confidence existed between the board of health and the political leaders of the city. Although this cooperation had been forthcoming in Baltimore, and one or two other cities, it could not be expected to occur often.[78] A more formal relationship was needed; this fact the convention readily recognized. The tone of the debate on the proposed sanitary code, mainly for this reason, was extremely favorable to it, and as the four-day meeting came to an end the assembled delegates gave almost unanimous approval to the code.[79]

The convention of 1859 closed on a note of optimism. The day of widespread sanitary reform was not far off, the president said in his final address. He urged those who were vitally concerned with sanitary improvement to strike hard now, for once the people were awakened to the importance of public health and were moved to demand reform, " their servants, the legislatures, will—they must—then grant it." [80]

Numerous developments of that time seemed to warrant this spirit of optimism. A health bill, prepared by the New York Sanitary Association, was at that very moment being seriously considered by the state legislature, and it had strong backing from many quarters.[81] Several minor laws aimed at correcting social abuses, thus indirectly furthering public health, had already been passed in some states and cities: for instance, the pure milk law of Massachusetts

[77] *Proceedings of the Third Sanitary Convention*, pp. 114-120.

[78] An example of how easily a political machine could block health reform was taking place in New York City at that very moment. *Leslie's Weekly* had begun a campaign in 1857 against swill milk from diseased cows. Despite two years of rising public indignation, political leaders of the city, through their control of the board of health and other agencies, had prevented any legislation to correct this indisputable, acknowledged evil. Mott, *American Magazines*, II, pp. 456-458.

[79] *Proceedings of the Third Sanitary Convention*, pp. 209-210.

[80] *Ibid.*, p. 240.

[81] *American Medical Times*, I, 1860, pp. 423-424.

(1856); the appointment of milk inspectors in Boston (1859) and the collection of milk samples for examination; the first pediatrics hospital in Philadelphia (1855) and one in New York two years later; the first day nursery (1858); and the campaign against milk from diseased cows in New York (1857-1859).[82]

Fully as significant as these practical accomplishments was the increasing sympathy being displayed toward sanitary science. The fourth annual meeting of the National Quarantine and Sanitary Society, held in Boston on June 14, 1860, extended its sanitary research into areas formerly untouched. Plans to continue the Committee on Civic Cleanliness, which presented an admirable report to the society on drainage, paving, water supplies, and sewerage, and the Committee on Tenements were approved. Additional committees were appointed to investigate the effect on health of the working hours of labor and to devise a plan for mapping the physical geography of cities for statistical and sanitary purposes.[83] The American Medical Association at its annual meeting in May, 1859, at Louisville, Kentucky, had appointed a committee to report on the influence of drainage and sewerage of large cities on public health, a work that the committee members prosecuted with vigor and enterprise. Other hygienic subjects were also placed on the schedule of business for future meetings.[84] In New York the *American Medical Times*, a new medical journal under the editorship of Dr. Stephen Smith, with Drs. Elisha Harris and George F. Shrady as associate editors, fought strenuously and continuously for the reform of the health department of New York City.[85] Bostonians in 1860 were offered a series of popular lectures on Sanitary Science by E. Y. Robbins, and the

[82] Ravenel, *A Half Century of Public Health*, pp. 285, 290, 299; *American Medical Times*, IV, 1862, pp. 278-279.

[83] *Boston Medical and Surgical Journal*, LXII, 1860, pp. 429-436, 453-454.

[84] *American Medical Association Transactions*, XII, 1859, pp. 32-33; see also *Boston Medical and Surgical Journal*, LXII, p. 27.

[85] Nearly every issue of the *American Medical Times* contained some comment on sanitary reform. In its first editorial in 1860, the new journal announced that in the "department of Hygiene and State Medicine, it is designed to discuss practical questions and record the evidences of scientific progress in those important applications of our art. . . . Especially will Hygiene and every question relating to human health and public salubrity receive our most vigilant and faithful attention." *American Medical Times*, I, 1860, pp. 14-15.

following year the Boston Sanitary Association held its first meeting, at which Dr. Edward Jarvis, one of its founders, emphasized that cities without proper sanitary protection were often three times as unhealthy as rural districts.[86] A few weeks later the Massachusetts Medical Society supported the Boston Sanitary Association in its petition to the legislature for the establishment of a state board of health.[87] The newspapers of the day were not far behind medical journals in advocating health reforms in the larger cities. Increasingly more attention was being devoted to sanitary matters by the layman as well as the doctor.

But the high hopes of the Sanitary Conventions had to be held in abeyance while four tragic years in the history of the nation exacted their toll of anguish and suffering. Yet the health movement was not completely interrupted by this internecine struggle, for the health problems created by large volunteer armies gave the supporters of sanitary science a chance to substantiate their claims. Even more to the point, and of much greater importance to the future success of the public health movement, the war and its sanitary problems gave to the lay public a greater appreciation of the purposes of sanitation and of the benefits to be derived from the practice of hygiene.

[86] *Boston Medical and Surgical Journal*, LXII, 1860, p. 86; *ibid.*, LXIII, 1861, pp. 525-526.

[87] *Ibid.*, LXIV, 1861, p. 57.

TEXTS AND DOCUMENTS

LITHOPEDION FROM THE CASE OF DR. WILLIAM H. H. PARKHURST, 1853

GRACE PARKHURST BERNARD*

In the Albany Medical College are two lithopedions. One of them, according to Dr. Ellis Kellert,[1] is the specimen that has acquired considerable fame as the central figure in an episode in the historical novel, *Canal Town* by Mr. Samuel Hopkins Adams.[2] The hero, a physician, obtained the specimen at a graveyard autopsy and by his ghoulish act saved his professional reputation. The story has a basis in fact. The other monster, while untouched by the spice of scandal, is also of historical interest, and many of the original documents in connection with the case are in my possession.

My grandfather, Dr. William H. H. Parkhurst, was born in Herkimer County, New York, in 1813. He was graduated from Fairfield Medical College with honors in 1839, and practiced in Herkimer County until his death in 1901. The case of Mrs. Amos Eddy was undoubtedly the most spectacular one in his long and successful career. A clipping from a newspaper, presumably a Utica daily paper, but of which the name and date are uncertain, gives the following account:

MOST ASTOUNDING FREAK OF NATURE

On Friday the 7th inst., a post mortem examination was held by Dr. Parkhurst, on the body of the widow of Amos Eddy, in the town of Frankfort, Herkimer County, age 77 years, and to the utter astonishment of all present, a full-grown child was found, which she had carried for the term of 46 years. It was encased in a sort of bony or cartilagenous structure, except one leg and foot, and one elbow, which were almost entirely ossified.

The facts and circumstances of the above case will be published at full

* From the Division of Laboratories and Research, New York State Department of Health, Albany.

[1] Kellert, E. The museum and the historical novel. *J. Tech. Methods and Bull. Internat. Assoc. Med. Museums*, 1945, no. 25, 87-90.

[2] Adams, S. H. *Canal Town*. New York, Random House, 1944, 466 p.

length in the different medical journals, as soon as Dr. P. finds leisure to put together the history—of which he has extensive notes—that he has kept for the last 12 years, as well as of her life before and after marriage, which took place 52 years ago.

Doctor Parkhurst presented the facts of the case before the Herkimer County Medical Society. The original, unedited manuscript [3] is well preserved; reproduced verbatim, it reads as follows:

To the President and members of Herkimer County Medical Society. Gentlemen. In conformity to the requirements of this Society through our President at our last annual meeting I present the following short history of a case, which, however uninteresting it may be to the Society, must be considered most certainly as one of very singular and very rare occurrence.

A little over one year ago a post-mortem was conducted by me, on the body of an aged woman in the town of Frankfort, which resulted in the singular discovery of the subject of this sketch, and which was noticed at the time in one of the Utica Dailies; and which might have been observed by some of the members of this society. The case is one of Extra-Uterine conception. There are very many cases of this kind upon record of degenerated conception, but with all its circumstances I know of none more rare, and what has made it more interesting to me, it is the only one, within my acquaintance; and it is from this fact that I have concluded to present it to this Society. The woman of whoam was this anomalous production, was by maiden name, Rebecca Smith. She was born in Fredericks town in the year of our lord one thousand seven hundred & seventy five, and was of English descent her grand parents being both from England. Her mother Sarah Smith gave birth to 24 children, of that number there were 4 pairs of twins, Rebecca being the twelth child. Amos Eddy the father to this progeny was the third child of nine children. I mention these facts to show that the ancestors on both sides of the parentage of this marvelous production, had all the powers of procreation to the fullest extent. Consequently we ought to expect it to be handed down as far as the production of this pregnancy.

In eighteen hundred and forty two I became acquainted with the woman, haveing been called to see her in an attack of colic. I found her laboring under all the characteristics of a severe form such as severe spasmodic pains of the abdomen recurring at short intervals, and accompanied with excessive vomiting. In makeing the examination, necessary to get the proper diagnosis and correctly, I passed my hand over the abdomen and was almost started with fright, at the largeness, hardness and irregularity of what I found, and

[3] Parkhurst, W. H. H. Manuscript of report to the Herkimer County [New York] Medical Society.

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The case is one of Extra-Uterine Conception. There are very many cases of this kind upon record of degenerated conception, but with all its circumstances I know of none more rare, and what has made it more interesting to me, it is the only one, within my acquaintance: and it is from this fact that I have concluded to present it to this Society ——

PLATE I.

First page of manuscript of Doctor Parkhurst's presentation to the Herkimer County [New York] Medical Society.

consequently made many hasty inquiries concerning it. The patient being too sick to answer my interogatories, a neighboring woman who was present voluntarily told me that she had been so for a great many years and that there were many conjectures concerning it, both among Physicians as well as the whole community, and that when my patient got well she would tell me the particulars. In the course of five or six days, she became convalescent, and finding that I was particularly mindful of her condition, took great pains in relating to me all the particulars, from the time of the supposed embryotic formation, through the whole period of a natural pregnancy, and the intervening time that had elapsed up to the time mentioned above.

It was as follows: She was married at the age of 20 years, in New Lebanon village in Columbia County, and with her husband Amos Eddy, came in a very short time to the town of Frankfort Herkimer County and I would state where they both lived and died he at the age of 70. & she the age of 77. After they had been married for the space of seven years she became pregnant: and the symtomps attending the early stages was nothing different from ordinary pregnancies. The catamenial secretion which had always shown itself in a proper manner before this, and which had made its appearance about the age of 14, now ceased, attended more or less with a fulness of blood about the head with nausea & occasionally vomiting, and many other symptoms which usually accompany this important change of system.

As the different months passed by, quickning as it is termed took, place, at the usual time, and after that motions of the child were felt, and increased in strength, during the remaining part of nine months, and as she firmly stated for many years after.

As so many years had already passed since their marriage and they had not been blest with an heir, they both looked forward to the time when she should present to her husband an offspring to crown each other with what they most desired: and in the expectation of all this, the necessary preparations were made, all the little fixings were selected and completed and laid away in a carful manner for ready use; but like the to-morrow, the wished for time never came.

At the expiration of eight months and a half the following occurrence took place. It is well known that fifty years ago & even thirty, most of the cooking was done by fire places; cook stoves being very rare if any at all—and at the time in point with Mrs. Eddy she done her work & cooking by a fire place. It is well known that fifty years ago & even thirty, most of the cooking almost any individual; it was by the construction of an instrument called familiarly by the name of Crane so hung upon one side of a fireplace that it could be swung over the fire, or outside the fire at the pleasure of the individual using it; and then hooks were made of iron to hang on the crane at one extremity and upon the other extremity were placed the kettles for use. As mentioned above at eight months and a half, while preparing a boiled

dinner in a large kettle over the fire, suddenly the hook gave way and the pot fell forceably into the fire upsetting & producing, as we might suppose upon the nervous system of a pregnant woman a shock of surprise & general consternation. In the space of two or three hours from this, labor pains followed, and continued all the afternoon until evening and with such regularity & force that her nurse or the woman who had been summoned to her assistance advised sending for her Physician and Dr. Farewell who lived in the town of Litchfield & who has long since been numbered among the dead, was sent for, and arrived in the fore part of the evening, and told her he thought he would put her to bed in about three hours; but instead of the labor going on in a more determined manner as time advanced, her pains began to diminish both in strength and frequency and in the morning they had left her altogether: and the Doctor, went home, with instructions to be sent for immediately when labor should again come up. The day past and she remained comfortable, & so on day after day, and which was thought nothing of from the fact that her time for confinement had not expired by two weeks; Mr. Eddy kept his horse up from the time the Doctor left, for the space of three weeks, and finding that the probabilities were no more favorable for its use, than before he turned his horse again to pasture. About this time Mrs. Eddys health began to fail, anxieties increased, and her Physician was consulted; and from day to day her case was carefully watched and presribed for, and each week that followed produced still more anxiety, not only with herself and friends, but with her physician.

Already her health became so poor that she kept her bed altogether; and her physician believed that the case was enshrouded in much mystery and that she could not survive long, unless a favorable change was soon brought about; hence the views of the different physicians were obtained, a consultation of many of the most eminent medical gentlemen in the country were collected together, such as Drs. Guiteau, Hul and the older Coventry of the City of Utica & Dr. Joseph White of Cherry Valey & to deliberate more closely in her case.

The result of this investigation lead to nothing satisfactory; for no individual physician, nor the whole together could diagnose the true nature of her condition. Though all thought that it was some peculiar growth of the Uterus, but none could believe it to be a child. Month after month rolled away, and at the expiration of about one year and a half, her health began slowly to improve; though her bulk of abdomen, which had been very large, did not diminish but little, perhaps no more than by absorption of the adipose matter which was deposited in the abdominal cavity.

In a gradual manner she finally regained her health; and when she had so far recovered that she could travel about the county she consulted very many physicians; Dr. Willoughby was consulted at one time, and gave it as his opinion that it was a bony tumour of the Uterus and wherever she

could find skill or hear of men that could possibly remove the many doubts of her case there she would go for opinions: and she even obtained works to read, that treated upon subjects of diseases of the Uterus in order yet to solve the mystery. For she was a woman of unsual determination of character, and had more than an ordinary share of common sense.

During the time that intervened between her recovery and the time of her death, she was subject often to attacks of Colic, and various spasmodic pains and affections of the Bowels, and often so violent that it required medical attendance to remedy the evil. For the first thirty years after her recovery, she would often have attacks very similar to travail, and call in her neighbor woman to advise for her; and sometimes would send for her physician; many times it would require strong antispasmodics to controll the difficulty. About twenty years ago Dr. Budlong of Frankfort was sent for in great haste to see her in one of these Labor analogies; and after urging his horse to the utmost on arriving he found she had nearly become quiet. He made an examination per vaginum and found nothing abnormal in any of the parts, and said to her that he discovered nothing. She replied in great earnestness that if he had been there when she first sent for him, she knew he would have delivered her of her Burden.

Such then has been the traverse of this singular state of things, and nothing positive was ever revealed until the examination after death, and there never could be except by the use of the knife.

There was nothing interesting conected with the post mortem worthy of remark, aside from the fact that a perfect formed child was found weighing 6 pounds avordepois; and was removed in the presence of about twenty persons mostly aged matrons. The position of the child was found with the occiput resting on the symphasis publis its face and front looking towards the spine of the mother reclining a little on its left side, and lying to the right of the spine or median line of the abdomen. It had no adhesions or connections with the mother except to the Falopian Tubes, and the blood vessels which nourished it, and which were given off from the mesenteric arteries.

Now Mr. President and Gentlemen, I see but little chance to speculate upon the leading features of this case; but I should simply give it as my opinion that the colic from which she suffered so often, was produced mostly by the pinching of some coil or turn of intestine which might have happened to fall beneath the child producing compression & stricture: the sequel of which was severe irritation & perhaps inflammation, which required active treatment to subdue it.

You will please observe that the child was almost floating in the abdomen, with the exception only of the small tie along a small portion of the under-surface as before mention. Hence it is easy to see, that when the body rocked this way or that way portions of bowel might get under and produce the trouble mentioned.

Again how came the child in the abdominal cavity. Is it possible that the fright produced on the mother, by the falling of the kettle ruptured the Uterus, and that the child sliped into the abdomen, and haveing life, sufficient adhesions took place, blood vessels were formed which were sufficient to nourish & prevent decomposition, and thus becomeing innocuous, was carried through life. I think this does not seem probable, from the fact that there is no appearance of a cicatrix of the Uterus. Again there has been no knowledge of a placenta or umbilical cord neither by expulsion from the Uterus at the time of her illness, nor was there any such thing found at the time of disection. These I think are facts sufficient to show that there was no rupture.

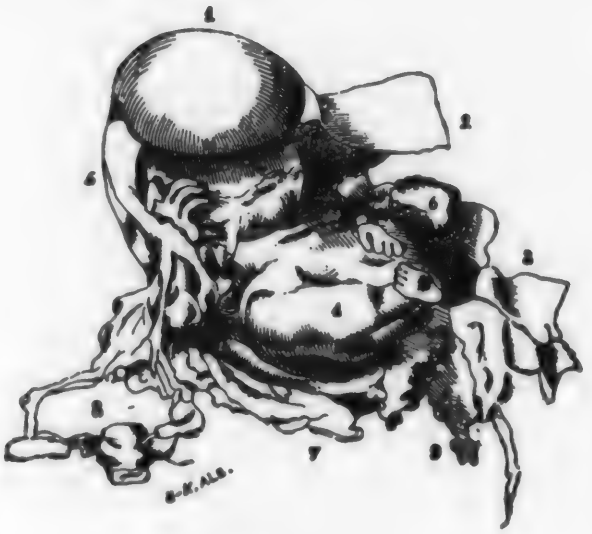
Then there can be but one way to account for this foetus being found in the cavity of the peritoneal sac, namely that the ovule be impregnated and matured without ever reaching its destiny in the uterus. Whether this was from an impervious state of the falopian tube, which was produced in connection with the pregnancy, by spasmodic action, from a puffing of its lineing by excitement and irritation or by a previous inflammation which closed up the tube by positive adhesion & consolidation must be a mere matter of conjecture. This specimen was enveloped in a firm dense cartilage. The limbs trunk and head being situated in the best possible manner, for occupying the best and least possible space; the thighs flexed upon the body and the legs upon the thighs, the elbows resting upon the knees, the arm lying close upon the side, & fore arm and hand thrown diagonally across the chest the hand resting on the side of the cranium, the face thrown down upon the chest. One lower extremity and a large share of the uper of the same side were the only parts uncovered by this cartilaginous case; and these are covered by an ossific or earthy deposit. This common shield or encasement is of irregular thickness, owing in all probability to the effect of friction. Hence we find the side of the two extremities where this is wanting is the side upon which it reclined and which was offered to the hard & irregular surface of the mothers spine.

This woman was born in the year one thousand seven hundred and seventy five, married in 1795, makeing her 20 years of age, became pregnant in 1802 seven years after she was married. Died in the year 1852 which time being rightly computed makes 50 years that she carried this foetus.

The facts were later presented to the Medical Society of the State of New York.[4, 5] (Plates IIa, IIb, III) The case is said to have

[4] Parkhurst, W. H. H. Extra-uterine conception. *Medical Society of the State of New York. Transactions.* 1854, p. 33-39.

[5] Armsby [J. H.] Doctor Parkhurst's case of extra-uterine conception, with a review and engravings. *Medical Society of the State of New York. Transactions.* 1855, p. 154-157.



1. Cyst.
2. Cyst.
3. Cyst.
4. Right Leg.
5. Cyst.
6. Left Foot.
7. Omentum.
8. Uterus.

Plate II a

1. Vertex.
2. Face.
3. Left Knee.
4. Left Hand.
5. Right Arm.
6. Right Leg.

Plate II b

Drawings reproduced from Doctor Armsby's account of the case.[8]

PLATE III

Photograph of lithopedion from Rebecca Smith Eddy presented to the museum of the Albany Medical College, 1854.

evoked widespread interest. Doctor Parkhurst was asked to present the specimen to the Albany Medical College, to which request he acceded. A letter dated March 1st, 1854 accepting the contribution to the museum was sent to him by Dr. Alden March, founder of the Albany Medical College and later president of the New York State Medical Society. The name of the doctor to whom reference is made in the letter is uncertain, but may have been Dr. Ira Harris, at that time president of the Board of Trustees of the college. The letter (Plate IV) reads in part:

> I believe we are indebted to you sir, for a valuable specimen of extra uterine conception sent down with the report of the case, through Dr. Harris (?) to the State Medical Society at its late meetings.
>
> A vote of thanks was ordered by the society and a request, that you would deposit the specimen in the Museum of the Albany Med. College for the benefit of the Society and the medical profession, subject to your order, and that a copy be transmitted to your address. I do not know as the Secretary has yet carried out the wishes of the Society. But as a member of that body, and in behalf of the friends of our College, I can speak for them, and give you this intimation of our wishes.
>
> . . . . . .
>
> I am yours with much respect.
>
> Alden March

Doctor Parkhurst was elected to the Herkimer County Medical Society in 1840 and to the State Medical Society in 1863. After his death in 1901 a memorial in the *Transactions*[6] stated that "although Doctor Parkhurst settled in a small town and gave his energies to a country practice, nevertheless he was a man of marked ability, and was counted as such by such colleagues as Austin Flint, Frank Hamilton, and Alden March . . ." (Plate V)

My family took considerable pride in my grandfather's work. When I made a trip to Albany in 1899 I was urged to view the lithopedion in the museum. I found it displayed with a card indicating its source. Recently I asked to see the specimen again; it has remained just as

[6] McCombs, G. M. Memorial of William H. H. Parkhurst, M.D. *Medical Society of the State of New York. Transactions.* 1901, p. 428-429.

I believe we are indebted to you Sir, for a valuable specimen of that extreme curvature of the spine, known with the Report of the case, through Dr Hosack, to the State Medical Society at its late session.

A vote of thanks was drawn by the Society and a request that you would deposit the specimen in the Museum of the Albany Medical College for the benefit of the Society & the medical profession, subject to your order, and that a copy be transmitted to your address - I do not know as the Secretary has yet communicated the wishes of the Society - that as a member of that body, and in behalf of the friends of our College I can speak for them, and give you this intimation of our wishes -

We have quite a large number of students now in attendance on our Spring course of Lectures. Saturdays are devoted to clinical Surgery; and it would gratify us much to receive a visit from you, accompanied by your little patient, on some Saturday for the examination at least -

I am yours with much respect

Alden March

PLATE IV

Last page of letter from Dr. Alden March, founder of the Albany Medical College, to Doctor Parkhurst; dated March 1, 1854 at Albany, New York.

PLATE V

William H. H. Parkhurst, 1813-1901. From a daguerreotype in the author's possession.

pictured in my memory. I have been told that it is still used today in the teaching of anatomy and pathology.

Acknowledgement: My thanks are due to members of the staff of the Division of Laboratories and Research of the New York State Department of Health for assistance in preparing the manuscript and the photographs, and also to the Albany Medical College for permission to photograph the lithopedion. In particular I am indebted to Dr. Albert H. Harris for encouragement and advice in the presentation of this record.

NOTES AND COMMENTS

PATTERNS OF HUMOR AND TEMPO IN *KING LEAR*

JOHN W. DRAPER

In Shakespeare's later work, the tempo of the characters' speech seems to arise not only from the passing situation but also from the several humors of the speakers: Antony's phlegm especially appears in the retarded speech of his more amorous, and therefore more phlegmatic, scenes;[1] and Othello's choler—and his consequent speed of utterance—rises with his choleric jealousy;[2] and the choleric Laertes, likewise, speaks with the speed of anger in the rebellion scene.[3] Even the mercurial Macbeth varies more and more violently between fast and slow as those who guided and restrained him are removed and he lurches wildly toward catastrophe.[4] Of all the humors, the most dangerous and violent was melancholy, especially when it passed over into madness; and Shakespeare's most violent play is unquestionably *King Lear*, violent in its barbaric setting, violent in its political implications,[5] even physically violent in the storm and in the putting out of Gloucester's eyes, and so violent in its psychological reactions[6] that it surely must reflect violent contrasts in its tempo. Indeed, this tragedy should present a study of the correlation of setting and humor with the timing of the rhythm. The barbaric setting should, moreover, make for the uninhibited expression of the character's emotions—quite different from the slow and quiet deadliness of *Hamlet*, a tragedy of court intrigue.

[1] See the present writer, "Speech-Tempo and Humor in Shakespeare's Antony," *Bull. Hist. Med.*, XX, 426 et seq.

[2] See the present writer, "Patterns of Tempo and Humor in *Othello*," *Eng. Studies*, April, 1947.

[3] See the present writer, "The Tempo of Hamlet's Role," *Neophil.*, to appear.

[4] See the present writer, "Patterns of Humor and Tempo in *Macbeth*," *Neophil.*, to appear.

[5] See the present writer, "The Occasion of *King Lear*," *Stud. Phil.*, XXXIV, 176 *et seq.*

[6] See the present writer, "The Old Age of King Lear," *JEGP.*, XXXIX, 527 *et seq.*

Such a correlation certainly exists on a small scale. In Act II, Scene i, for example, the wicked Edmund tricks his noble half-brother into a sudden, guilty-looking flight; haste is of the essence in the scene; and the slurrings apparent in the meter, together with other evidences, amply reveal it. The twenty lines that follow the entrance of Edgar contain seventeen slurrings, some as extreme as *i'the night*, *defend* in one syllable and *To stand's*, in place of *To stand his*; and they also supply rhetorical questions, exclamations and ellipses. The only evidence of retardation is *up* | *on* used twice, presumably emphatic. In short, all evidences agree in showing the speed that the situation demands. In the dialogue that follows these twenty lines, Gloucester, with his emphatic repetition of "Where | is," takes charge of the situation, and shows a comparative calm in contrast to Edmund's excitement, which, being feigned, is somewhat overdone. The tempo of this whole passage in short, expresses, not so much the humors of those concerned, as the requirements of the situation. Sometimes, however, the tempo seems directly to express the humor of the speakers. In the first scene, for instance, Goneril and Regan, though they try to cloak their choleric ambition in fawning phrases, reveal it in the rapid tempo of their glib compliments to the old King; and Cordelia, in contrast, speaks with womanly phlegm, slowly, and uses such unslurred forms as *I* | *am*, *can* | *not*, *You* | *have*, *Why* | *have* and *ne* | *ver*, in monosyllabic lines that defy tripping delivery: Cordelia is truly feminine, and they are near-monsters in the guise of women. These subtly shifting and contrasting tempos, and the causes that play such changes on them form the subject of the present study. First, *King Lear* as a whole will be considered, and then each of the major characters.

The average tempo of the tragedy is very rapid; and all the acts but the third have ratios between 1:2½ and 1:3. The verse of Act III yields only 1:2—; but so much of the dialogue is in presumably rapid, colloquial prose, that the actual speed of this act must equal that of the other four. The rapidity of the play appears not only in the number but in the quality of the slurrings. The first scene, for example, which has the same average speed as the drama as a whole, yields such unusual and sometimes almost unpronounceable slurrings as the following in two syllables each: *Bergundy*, *Goneril*, *Albany*,

opulent, *following*, *Jupiter*, and in three syllables, *perpetual* and *t'acknowledge*, as opposed to a very few examples at the other extreme, but not very extreme at that: *mys | teries*, for instance, and *Belovèd*. In short, both the quantity and the quality of the slurrings show an average of swift speech.

Individual scenes, however, present a wide variety, the fastest 1:9, and the slowest 1: ⅔; but there are more very fast scenes than very slow, with such ratios as 1:9, 1:8+, 1:6+, and 1:5. The most rapid scene in *Hamlet*, when Laertes breaks in with the mob, is only 1:3—, not far from the average for the whole of *Lear*, and nowhere near the tempo of the scenes just mentioned. No scene in the savagery of *Macbeth* or the frenzied passion of *Othello* has such seething torrents of words. Some of these fast scenes are perhaps too short for the ratios to be very significant; but Lear and Kent in the storm speak almost a hundred lines with a ratio of 1:6+; and one can hardly escape the conclusion of headlong speed concentrated in the play at certain points. Three scenes run under 1:2: Act III, Scene vii and Act IV, Scene v are given to intrigue; and such material, as appears in *Hamlet* and in the role of Iago, required circumspect and slow speech. The slowest scene is Act III, Scene vi, when Lear and his friends take refuge in the farmhouse from the storm. Over half of it is in prose; and the slow tempo of the verse seems to express the physical and nervous exhaustion after the whirlwind of passion that precedes. Its ratio of tempo is 1: ⅔, more retarded than the slowest scene in *Hamlet*: thus *Lear* not only out-Herods the earlier tragedy in unrestrained *prestissimo* utterance, but also has at least one slower scene. *Hamlet* is a drama of Renaissance court intrigue; *Othello*, a drama of domestic life; *Macbeth*, a drama of political violence in barbaric times: *Lear* has intrigue, has a domestic problem at its core and an outpouring of political violence. Children intrigue against their parents; the old King divides his kingdom and half-abdicates; and war and personal outrages ensue. In a barbaric setting, Shakespeare has combined the most moving motives of his tragedies; and the result is apparent in the contrasting extremes of tempo.

In *Hamlet*, *Macbeth* and *Othello*, the fastest scenes come in the third and the fourth acts, with slower ratios in the first two, and

THE TEMPO OF VERSE LINES IN *King Lear*

(Ratios based on less than 25 lines are in parentheses.)

Scenes	No. of Lines and ratio of speed	Lear, choleric to melancholy	Cornwall, ?melancholy	Albany, sanguine or choleric	Kent, ?choleric	Gloucester, ?sanguine	Edgar, choleric of the sun	Edmund, melancholy pretending sanguine	Goneril, choleric	Regan choleric-melancholy
I, i	306 1:2½	1:2½+	..	..	1:3	1:1	..	..	(1:3)	(1:3)
ii	175 1:3½+	..	..	..	..	0:6	..	1:3	..	..
iii	27 1.8+	..	..	..	..	..	..	..	1:5+	..
iv	347 1:2	1:1½+	..	(1:2)	1:1½	..	..	..	1:3−	..
v	49 prose	..	..	..	..	..	..	..	..	..
II, i	129 1:2	..	(1:2)	..	..	1:1+	(0:2)	(1:4)	..	(1:2+)
ii	168 1:2½	..	1:½	..	1:2½	(1:15)	..	prose	..	(1:5)
iii	21 (1:5)	..	..	..	..	..	(1:5)	prose	..	..
iv	308 1:3+	1:3−	(0:10)	..	1:4−	(1:2½)	..	..	(1:2)	1:2+
III, i	55 1:2	..	..	..	1:1½	..	..	..	..	..
ii	96 1:6+	1:15	..	..	1:3−	..	..	..	..	..
iii	25 prose	..	..	..	..	prose	..	prose	..	..
iv	180 1:3+	1:3	..	..	(1:6)	prose	(0:1)	..	..	..
v	24 prose	..	prose	..	..	..	..	prose	..	..
vi	115 1:⅔	prose	..	..	(1:1)	(1:1½)	(1:7)	..	..	..
vii	106 1:1½	..	1:2	..	..	1:1	..	..	..	(1:4−)
IV, i	80 1:2½	..	..	..	..	1:2	(1:4−)	..	..	..
ii	97 1:3+	..	..	1:3½	..	..	..	..	1:2	..
iii	55 1:9	..	..	..	1:5	..	..	..	..	..
iv	29 1:3	..	..	..	..	..	..	..	..	..
v	40 1:1	..	..	..	..	..	..	..	..	1:1+
vi	286 1:3	1:2+		..	..	1:2−	(1:6+)	..	..	..
vii	98 1:2	1:1	..	..	(1:3)	..	..	..	..	..
V, i	69 1:4½	..	..	1:4½	..	..	(1:3)	1:5	(1:4)	(1:3)
ii	11 (1:5)	..	..	..	..	(0:2)	(1:4)	..	..	..
iii	326 1:2½−	1:2½	..	1:2−	(1:2−)	..	1:5	1:2−	(1:3)	(1:2½)
Average		1:2½+	1:2½	1:2−	1:2½−	1:2½−	1:2	1:5+	1:2½+	1:3−	1:2+

perhaps the slowest at the end, when tragedy fades into the light of common day, and the emotions have worn themselves out into quiescence. In *Lear*, however, there is at least one very fast scene in every act; and the three slowest scenes occur in Acts III and IV. Perhaps the violence of this drama was so titanic that normal tempo-patterns would not serve; and the rise and fall of speeds appears, not in the play as a whole but in each individual act: at all events, the fastest scenes never open or close an act, but come in the middle, just as the fast scenes of *Othello* come in the middle of the whole play. Likewise, the slow scenes are found toward the beginnings and the ends of the several acts. Such a pattern can hardly have been quite accidental, and suggests that the traditional act-division of the drama is correct.[7]

The tempo of the title role is even more extreme than that of the individual scenes, and shows a sort of systole and diastole in symmetrical, cyclic pattern. In the first scene, in which Lear gives away his kingdom, his speech is fast, about the average of the play. His second scene is slower, perhaps because of shock at Goneril's ingratitude: a comparable shock dazed Desdemona and slowed her speech in the last scene of *Othello*.[8] For his next three scenes, until the middle of Act III when his " wits begin to turn," his lines show a *crescendo* of speed; and, in the first storm scene, he reaches the unprecedented ratio of 1 : 15—if any actor could possibly enunciate more than twice as fast as the frenzied Othello! In the following lines, Lear slurs even such words as *element* and *horrible*, both into two syllables, altogether fifteen evidences of speed; including five exclamation-points and the only evidence of slower tempo is a single *never* for passing emphasis—perhaps a sort of *Leitmotiv* in preparation for the repeated *nevers* in the final scene:

> Rumble thy bellyful! Spit, fire! spout, rain!
> Nor rain, wind, thunder, fire are my daughters:
> I tax not you, you elements, with unkindness;

[7] Cf. H. Granville-Barker, *Prefaces to Shakespeare*, Princeton, 1946, I, 270 *et seq.*

[8] Those who follow Professor Bradley in thinking that Hamlet suffered from extreme shock during most of the play, should note his volubility both in dialogue and in soliloquy.

I nev | er gave you kingdom, call'd you children,
You owe me no subscription: then let fall
Your horrible pleasure; here I stand, your slave,
A poor, infirm, weak and despised old man:
But yet I call you servile ministers,
That have with two pernicious daughters join'd
Your high-engender'd battles 'gainst a head
So old and white as this. O! O! 'tis foul!

His mind breaks; and his insane meanderings are generally in prose; but his verse lines show, as one might expect, not a choleric speed, but the *rubato* jerkiness of melancholy; and this variable humor perforce presents enough slow items of evidence to reduce the average ratio; and, in the mad scenes, his ratio falls to 1 : 3 and 1 : 2+. Indeed, even before lunacy has made his speech incoherent, this *rubato* rhythm of rising melancholy is apparent in his lines; and, for example, Act III, Scene iv, lines 6-22 would diagram [9] as follows, still very fast, but growing jerky, with no adequate explanation for some of these changes in the tempo: FFFFSFSFFFFFF | FSFSSFSFF | F. The short, happy interlude of Lear's cure falls, in striking contrast, to the very slow time of 1 : 1; and his longest speech in this scene, "Pray do not mock me . . ." has seven evidences of slow tempo to only four of fast. At the finale of the play, he rises again to the approximate tempo of the initial scene. Thus the general graph of his speed is like a W with the centre five times higher than the two arms. One might have expected a more quiet, passive end as in *Othello*; but the return of normal life in that barbaric age was far more robustious than in sophisticated Venice. Even as he dies, Lear's choleric vehemence is not quite spent, and achieves a speed of 1 : 2½, almost as fast as the first scene. Indeed, the ratio of this last scene would be much higher were it not for the single line "Nev | er, nev | er, nev | er, nev | er, nev | er"—an expression of utter frustration and hopelessness hardly to be matched in all literature, and also a supreme

[9] F stands for an item of evidence for fast tempo; S for slow; and | for a line without evidence.

test of the actor's art. Indeed, Lear's tempo shows the extremes of a tragedy that verges upon the very limits of the theatre's art.

Albany and Cornwall, the two suitors of the wicked sisters, present a significant contrast. Albany, doubtless because he shared his title with James I, is carefully excluded from all evil, and presented as a virtuous, if somewhat colorless, gentleman apparently as easily misled as Duncan;[10] Cornwall is as bad as Goneril and Regan. Albany's ratio is 1 : 2½–; and Cornwall's 1 : 2–; and this again illustrates that only the honest and straightforward can afford the luxury of rapid speech. Cornwall, however, shows the greater variation, and rises to the ratio of 0: 10 when he has Kent put in the stocks; but he speaks only twelve lines in this scene. When Gloucester is blinded, his average is only 1 : 2 : apparently, he takes this cruelty very calmly. Albany has more lines and is more consistent and faster: he never falls below 1 : 2–, and he rises to 1 : 4½. Most of his verse lines are in Act IV, Scene ii when he blames Goneril for her treatment of Lear, the "gracious, aged man." Here his rhythm is generally rapid and *legato*, with only a few unslurred words where emphasis is required. Cornwell's slow and studied tempo suggests his evil nature; and his few speeches of any length suggest the *rubato* rhythm of melancholy. Albany's even speed suggests in contrast an open sincerity, consistent with the sanguine humor or with the mild choler that was under the astral influence of the sun. The humor of each of these figures agrees in general with his tempo; but many of their scenes yield too little evidence to make more detailed study possible.

In more striking, and more significant, contrast are Gloucester's two sons, Edmund and Edgar. The former is base-born; and, though recognized by his father to the extent of being educated abroad, he bears out his illigitimacy in his evil character,[11] and seems, like other scheming villains to be appropriately melancholy.[12] His legitimate half-brother, on the other hand, is all that virtue and honor

[10] See the present writer, "The Gracious Duncan," *MLR.*, XXXVI, 495 *et seq.*

[11] See the present writer, "Bastardy in Shakespeare's Plays," *Sh. Jhb.*, LXXXIV, 123 *et seq.*

[12] See the present writer, *The Humors and Shakespeare's Characters*, Durham, N. C., 1945, 73 *et seq.*

could desire, and so seems to be sanguine, or mildly choleric under the astral influence of the sun.[13] In the middle scenes, Edmund speaks entirely in prose, and his general average is 1 : 2½+, the same as that of the whole play: the former is a glib schemer; but the latter has the even quicker speech of one who has nothing to hide. In single scenes, Edgar's ratios run as high as 1 : 7 and 1 : 6+, and he never goes as low as the average of the play. His lines are not only as fast as choler might well make them, but also rather *legato* and even, in accordance with the serene sanguine temper, even when he is under some emotional stress. According to Elizabethan stage-convention, soliloquies are a sincere expression of the speaker's thoughts and feelings; and Edgar's soliloquy in the wood just after he has been outlawed should express surprise and horror at this unexpected catastrophe; and yet these twenty-two lines have eleven slurrings and only two highlights of slower speech, *part* | *is* and *I* | *will*, both clearly for emphasis. Hamlet's soliloquies, being faster than his dialogue,[14] seem to reflect the disparity between his inner self and its complement extern; but Edgar's flowing and little changing tempo suggests a mind fortified, like Orlando's,[15] against misfortune, and a candor that cannot stoop to simulation. At the end of the play, his speech of challenge so Edmund shows the same fast, *legato* movement, the few breaks in it being required by emphasis; and he uses the same tempo in announcing himself and telling of Gloucester's miseries and of Lear's. Indeed, this last speech of fifteen lines presents fifteen evidences of speed, in contrast to one slow highlight of supreme emphasis: ". . . the most piteous tale of Lear and him That ev | er ear received." The false Edmund's speech is slower and also, as one would expect of the melancholy humor, more *rubato*. The twenty-two lines of his soliloquy on bastards diagrams as follows: | S | SFFS | FSF | | | FS | FFFSF-SFFFF. What could one make but jerkiness out of the sequence of Legitimate . . . love | is . . . the legitimate . . . legiti | mate," the last of these lines being twenty syllables long with an exclamation

[13] *Ibid.*, 23, 58-60.
[14] See the present writer, "Hamlet" *cit. sup.*
[15] See the present writer, "Shakespeare's Orlando" *MLQ.*, II, 179 *et seq.*

point at the end! Evidences for fast and for slow speech so tumble on one another's heels that only the most accomplished actor could possibly render them. Again, his explanation to Gloucester of Edgar's flight beginning at II, i, 65, shows this same jerky tempo: | | FF | SSF | FSSFFS | | F. His soliloquy at the end of Act V, Scene i is phrased in short and fragmentary sentences that suggest a jerky delivery, but too many of the lines lack evidence to make one positive. A surer example is the beginning of his speech to Albany, beginning Act V, Scene iii, line 46, which diagrams FSF | | FSSFF; but the rest has only one indication of tempo. The four and a half lines that he speaks as he is dying and tries to undo some of the wrongs that he has committed, yields only two items of evidence, both fast: perhaps his wicked melancholy has left him, and with it his jerky speech, but the evidence is insufficient to be sure. On the whole, however, both he and Edgar seem to express their conflicting humors in their tempos, and so constitute a telling contrast in the tragedy.

Kent and Gloucester each have some three hundred and fifty lines; but so much of it is prose that generalizations are difficult. The former has an average of 1 : 2½–, and the latter 1 : 2; but the colloquial speed of the prose would probably raise these ratios somewhat. Kent seems to vary little from his norm except in Act IV, when his speed increases to 1 : 5–. In the third scene, the reason for this speed is not clear, unless it be the colloquial nature of his talk with the Gentleman. In the seventh, his speed contrasts effectively with the slower tempo of Cordelia and the newly recovered Lear. Gloucester seems twice to rise to a great speed: in Act I, Scene ii, so few of his sixty odd lines are in verse that the ratio is probably not significant; and his fifteen lines in Act II, Scene ii reach a speed of 1 : 15; and the rapid action of the scene perhaps justifies this extreme ratio. In Act III, Scene vii, he falls to 1 : 1, probably because of shock at his sudden arrest and at the anger of Regan and Cornwall. In the last scenes of *Othello,* Desdemona shows a similar reduction of tempo because of shock at her husband's charges. In short, Kent and Gloucester speak too much in prose for the computation of their tempos to be deeply significant.

Goneril and Regan are complements in tempo as in villany, and

both approximate the average of the play in speed. Both on occasion run up to 1 : 5, but Regan sometimes falls as low as 1 : 1+. In the first scene, each gives a speech of seven lines to express her love for Lear, Regan with three evidences of fast speed to one of slow; and Goneril, who is usually the faster, with four fast. Indeed, Cordelia may well refer to their "glib and oily art." Later, as if to emphasize their wickedness by making it deliberate, they drive their father out into the storm, not with a torrent of words, but with tempos that are slower than average; but, in the blinding of Gloucester, Regan rises to a ratio of 1 : 4–, and seems for the time to lose her temper. Neither shows any consistent change toward fast or slow; but, as with Antony,[16] the phlegmatic love-scenes tend to run slower, and the choleric battle scenes faster. Since Goneril's tempo is not only faster but more *legato*, she seems to be more choleric; Regan's shows more of the jerky, melancholic tempo, as illustrated in her speech to Oswald beginning Act IV, Scene v, line 8. It might be diagrammed thus: FSFF | | SSFSF. Again, lines 28 to 31: FFSSSFS. The sisters, therefore, are somewhat distinguished from each other, and between them they represent the two humors that were most dangerous and violent.[17] Goneril is the more ranting and swift in speech; Regan, the slower and more crafty.

The most telling contrast, however, is not between the two wicked sisters, but between them and Cordelia. She appears in only four scenes, with tempos ranging as follows: I, i; 1 : 1½—IV, iv; 1 : 4—IV, vii; 1 : 3—V, iii; 1 : 2. Her average for the whole play is, like Regan's 1 : 2+; but its rhythm is smooth and *legato*; and, in the first scene, where the three are especially contrasted, Cordelia is considerably the slowest. Here she has two long speeches: the first, in which she states her love for Lear, is consistently slow but for the commonplace slurring of *loved*; and the second, in which she justifies herself before the King of France, has nine evidences of speed, and only two of slower speech. She says that she is not "glib" as her sisters are; but, throughout the play, though she says little, her speech is flowing

[16] See the present writer, "Speech-Tempo and Humor in Shakespeare's Antony," *cit. sup.*

[17] See the present writer, *Humors, ed. cit.*, 55 and 74 *et seq.*

and even and sometimes fast. Kent says that her voice is "low";[18] and Lear, at the end recalls: "Her voice was ever soft, Gentle and low, an excellent thing in woman." A boy actor with such speech must have been a prize indeed, for most of them cried out on the top of question; and Shakespeare, fortunate in having one, could not forbear a comment, and seems to have fitted to the youth's abilities the *legato* music of the lines.[19] A "Soft and lowe" voice was thought to belong to "gentle" persons,[20] and so was particularly appropriate to Cordelia's part. In short, her actions, words and very rhythms of speech suggest the phlegmatic humor appropriate to ideal womanhood, an utter contrast to the ranting Goneril and the jerky speech of Regan.[21]

This is a tragedy of choleric and melancholy types, with Lear the epitome of both, and the sanguine, gullible Gloucester and the phlegmatic, womanly Cordelia in sharp contrast. On the whole, the tempo of the lines accords with these humors in the light of the changing situations of the plot. The play runs a tremendous gamut both of emotions and of varying speeds, and is full of dazzling white against opaque black: the evil Cornwall with his slow, somewhat halting speech against the quick and even Albany; the wicked and insinuating Edmund, letting fall drop by drop the poison of his words against the good name of the spirited and sanguine Edgar; the shrewish Goneril against the more crafty Regan; and both against the slower, soft-spoken Cordelia; and all of them in contrast to the senile Lear, riding the whirlwind of his lunacy. The tragedy rushes forward like the *presto* movement of a symphony; and, as appears in the accompanying chart, the contrasting humors of the characters express themselves in contrasting speeds of speech, and these give at times brief interludes of slower tempo: at Goneril's first signs of ingratitude, Lear, incredulous and dazed, falls to a ratio of 1 : 1½+

[18] *King Lear*, I, i, 155.

[19] For other evidences of his fitting the lines to an actor's voice, see the present writer, "The Tempo of Shylock's speech," *JEGP*, XLIV, 281 *et seq.*; and "The Tempo of Shakespeare's Speech," *Eng. Studies*, XXVII, 116 *et seq.*

[20] *Book of Arcandam*, London, 1592, See appended "Phisiognomie."

[21] Since the Fool's part is in prose, it has to be omitted from this study.

while she flings words at him at twice the speed. Act II, Scene i shows the slow speech of Cornwall and Gloucester against the faster Edgar, Edmund and Regan; and in Scene ii, Cornwall and Kent against the rapidity of Gloucester and Regan. Thus the tempo subtly shifts at the behest of humor and of situation. It is a tragedy of emotional extremes; and the clouds and thunder and lightening of the spiritual storm within the characters show themselves in the rhythms of the lines.

MEDICO-HISTORICAL NEWS AND ACTIVITIES

AMERICAN ASSOCIATION OF THE HISTORY OF MEDICINE

The Twentieth Annual Meeting of the Association was held at the Cleveland Medical Library on May 25 and 26, 1947. It was attended by 79 members from 23 states. Those present can testify to the gracious hospitality which was extended by the trustees and staff of the Cleveland Medical Library. At a reception given by the trustees the magnificent collection of herbals assembled by George G. Marshall was demonstrated by Dr. Robert M. Stecher, the librarian. The guests were also privileged to visit the Howard Dittrick Museum of Historical Medicine and the Historical Branch of the Army Medical Library, both of which are housed in the Cleveland Medical Library building. The complete Transactions of the meeting, including the papers read, will be published in the next issues of this *Bulletin*.

CONSTITUENT SOCIETIES

The Johns Hopkins Medical History Club, Baltimore, Md.

The Johns Hopkins Medical History Club held its third meeting of the year on May 14, 1947 in Hurd Memorial Hall, The Johns Hopkins Hospital. Dr. Henry E. Sigerist gave a valedictory address on "Medical History in the United States: Past—Present—Future."

Following the meeting a subscription dinner was given in honor of Dr. and Mrs. Sigerist in the Great Hall of the William H. Welch Medical Library. The speakers on this occasion included Dr. George W. Corner as Toastmaster, Dr. Allen W. Freeman, Dr. Alan M. Chesney, Dr. Owsei Temkin, Dr. Ernst Feise, Dr. Lowell J. Reed. Dr. Sanford V. Larkey was to have spoken also, but unforseen circumstances prevented him from attending the dinner.

NATIONAL NEWS

Centenary Meeting of the American Medical Association

During the Centenary Meeting of the American Medical Association at Atlantic City, N. J. the Session on History of Medicine was held on June 11, 1947 at the Claridge Hotel. The following papers on the History of American Medicine were read:

"In the Old Dominion." M. P. Rucker, Richmond, Va.
"In the Massachusetts Bay Colony" (Lantern Demonstration). H. R. Viets, Boston, Mass.
"In Philadelphia." R. H. Shryock, Philadelphia, Pa.
"In Kentucky and the Mississippi Valley." E. F. Horine, Louisville, Ky.

After a brief intermission, the address of the Invited Foreign Guest was given by Dr. E. Ashworth Underwood, Director of the Wellcome Medical Museum, London, England. Dr. Underwood spoke on "The Spread of the Public Health Movement, 1847-1947."

The session concluded with a group of papers on the History of Military Medicine:

"Public Health Service."	R. E. Dyer, Bethesda, Md.
"United States Navy."	L. H. Roddis, Washington, D. C.
"United States Army."	H. W. Jones, Washington, D. C.

National Gastroenterological Association

At the Twelfth Annual Convention of the National Gastroenterological Association which met at Atlantic City, N. J. on June 5, 1947, Dr. Hyman I. Goldstein, Camden, N. J., delivered an illustrated address on "The History of Gastroenterology and the Development of the Specialty in America." Dr. Goldstein has been elected the official Medical Historian of the Association.

Cleveland, Ohio

IN HONOR OF HARVEY CUSHING

On Wednesday, May 28, 1947, a group of friends and associates of the late Dr. Harvey Cushing, attending the meeting of the American Association of the History of Medicine, gathered at the Lakeview Cemetery in Cleveland to honor his memory. In the early morning sunshine, with a gentle breeze blowing, a wreath was placed on his grave by Dr. John F. Fulton, his biographer, who recalled a similar ceremony in Paris in 1905 when Sir William Osler made a pilgrimage to Louis's grave in Mont Parnasse Cemetery, with some twenty of his colleagues attending the Tuberculosis Congress [1] and another occasion in 1931, at Berne, when Cushing inspired a group attending the International Neurological Congress to visit the graves of Theodor Kocher, Hugo Kronecker and Edwin Klebs, where an unforgettable ceremony took place.[2]

The inspiration for the brief but touching tribute to Harvey Cushing came from two graduates of the Johns Hopkins Medical School, Dr. Esther Rosencrantz, of San Francisco, a Hopkins graduate in 1904 and Dr. Helen Hempstead (Mrs. Arnold F.) Furrer, who received her degree in 1905. Dr. Rosencrantz, who on an Osler pilgrimage had recently visited Osler's

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[1] Klebs, A. C.: Osler at the Tomb of Louis, *J. A. M. A.*, 46: 1716-1717 (June 2) 1906.

[2] Fulton, J. F.: Arnold Klebs and Harvey Cushing at the 1st International Neurological Congress at Berne in 1931, *Bull. Hist. of Med.*, 8: 332-354 (March) 1940.

birthplace in Bond Head, Canada, brought with her a bit of stone from the house where Osler was born. This she placed on Cushing's grave, with a few appropriate remarks on Cushing's kindness to her as a medical student.

Besides Dr. Fulton, Dr. Rosencrantz and Dr. Furrer, Miss Madeline E. Stanton, Cushing's former secretary, Dr. Howard Dittrick, of Cleveland, and Dr. Henry R. Viets, of Boston, were present.

HENRY R. VIETS.

New York, N. Y.

Friends of Dr. and Mrs. Henry E. Sigerist gave a farewell dinner for them on May 9, 1947, at the Hotel Plaza, New York. To assist Dr. Sigerist in the preparation of his comprehensive history of medicine to which he intends to devote his entire time after returning to Switzerland, his friends presented him with a complete set of the Index Catalogue of the Surgeon-General's Office and a cheque for $1000.00. The after-dinner speakers included Dr. Leslie A. Falk, Dr. Stuart Mudd, Dr. Richard H. Shryock, Dr. Arturo Castiglioni, Dr. George Sarton, and Dr. Alan Gregg. Dr. John F. Fulton was the Toastmaster.

The Mount Sinai Hospital, New York, N. Y.

During the past year a series of monthly Seminars in the History of Medicine were held at the Mount Sinai Hospital, New York, under the leadership of Dr. Frederick Zeman and Dr. Saul Jarcho. They received an enthusiastic response from the members of the Mount Sinai staff, and the attendance at most of the meetings ranged between thirty and fifty. The programs were as follows:

December 9, 1946

"Principles of Medical and Non-Medical Historiography" Saul Jarcho, M. D.

January 20, 1947

"William Withering As a Mineralogist" F. Zeman, M. D.
"The Physician As a Naturalist" Henry Janowitz, M. D.
"The Life and Work of Rafinesque" Samuel Feder, M. D.

February 25, 1947

Naval Medicine in the Eighteenth Century. Guest Chairman: George Rosen, M. D.
"Tobias Smollett" Alfred P. Fishman, M. D.
"The Voyages of Lord Anson" Morton Bader, M. D.
"The Voyages of Captain Cook" Richard Bader, M. D.

March 25, 1947

"The Ailments of Jonathan Swift" Solon Bernstein, M. D.
"The Sickness and Death of Henry Fielding" Milton Kannerstein, M. D.
"The Sickness and Death of Edward Gibbon" Howard Zucker, M. D.

April 29, 1947

"Milk Sickness" S. Davison, M. D.

"A Refugee Physician of 1848" Ernst Boas, M. D.

"An Eighteenth Century Discussion of Intravenous Therapy" Alberto Montoya, M. D.

May 27, 1947

"The History of Spectacles" Herbert Katzin, M. D.

"Corneal Transplantation: Its Place in the History of Ophthalmology" Gerald Branower, M. D.

"Carl Koller, a Colleague of Freud" Abraham Kornzweig, M. D.

June 24, 1947

"Laennec" Camille Dreyfus, M. D.

"Claude Bernard" Abraham Penner, M. D.

"D'Arsonval" Paul Kaunitz, M. D.

NEWS FROM ABROAD

Argentina

A new medico-historical journal is about to be published in Buenos Aires. Its name will be *Quiron, Archivos Latino-Americanos de Historia de la Medicina* and its directorship will include Dr. José Luis Molinari, Dr. Fernando M. Noussitou, Dr. Ramon Pardal, and Dr. Pablo Osvaldo Wolff.

Holland

The Genootschap voor geschiedenis der Geneeskunde, Wiskunde en Natuurwetenschappen (Society for the History of Medical Science, Mathematics and Natural Science) held its spring meeting on May 31 and June 1 at Amsterdam. Papers were presented by Dr. D. A. Wittop Koning, Dr. K. T. A. Halbertsma, Joh. Scheffer, Prof. Ir. R. J. Forbes, Dr. J. E. Schulte, and Dr. A. Schierbeek.

Scotland

A series of lectures on the history of medicine will be given during the summer term of the University of Edinburgh by Dr. Douglas Guthrie, Lecturer on Medical History. The course will be as follows:

April 17. The Historical Foundation of Medicine.
" 21. Prehistoric Medicine and Folk Medicine.
" 28. Medicine in Greece and Rome.
May 5. Arabian and Medieval Medicine.
" 12. The Early History of Chemistry.
" 16. *Guest Lecture by Sir Arthur MacNalty:*
Evolution of Preventive Medicine in Britain.

" 23. *Guest Lecture by Sir Henry Bashford:*
Hans Sloane and his Circle.
" 26. Great Epidemics of History.
June 2. Lister and his Achievement.
" 9. Medical Education in Scotland.
" 16. Sherlock Holmes and Medicine.

Dr. Guthrie also participated in the Bicentenary celebration of Dr. William Cullen's appointment as Lecturer in Chemistry at the University of Glasgow in 1747. He read a paper on May 9 entitled " William Cullen and His Times."

BOOK REVIEWS

ARMAND DE GRAMONT. *Vers l'Infiniment Petit.* Paris: Gallimard, 1945. 247 pp. 75 fig. Frs. 160.00.

This book published in a series "The Future of Science" is primarily not a historical book, but an attempt to orient the reader in all "the optical procedures utilized in the study of phenomena of very small dimensions": past, present, and future. It is perhaps just the fact that history comes in organically and not in an isolated form, which makes this book by the eminent French physicist more readable than many other histories of microscopy. M. de Gramont starts with Leeuwenhoek and follows the changing types of microscopes and microscopic techniques (polarized light, coloration, microphotography, microscopy of metals) up to the ultramicroscope and the electronic "microscope." Though the book was written before the first atomic bomb exploded, it duly ends with atomic fission and the possibilities (or impossibilities) of rendering the atom visible. Short, but significant, historical commentaries (strangely lacking only in the chapter on coloration) make the book an important item for the medical historian.

ERWIN H. ACKERKNECHT.

CLARENCE P. OBERNDORF. *The Psychiatric Novels of Oliver Wendell Holmes.* New York: Columbia University Press, 1943. 268 pp. $3.00.

Carl Ludwig Schleich once threatened to hang himself if his fame as the inventor of "Marmor Seife" did not cease to spread. Schleich was a competent surgeon, a first class musician, and an able painter, and—the discoverer of infiltration anesthesia. Yet he was—for a time at least—best known as the inventor of a soap.

Something of a similar fate "menaces" Clarence P. Oberndorf, the author of *The Psychiatric Novels of Oliver Wendell Holmes.* A psychiatrist of note, one of the pioneers in psychoanalysis, the author of a number of searching studies in the dynamics of the "psychiatric cure," Oberndorf is already better known, at least to the general public, for his "Marmor Seife"—for his psychological analysis of the novels of Oliver Wendell Holmes. This work has gone through three printings and two editions, and has evoked a great deal of favorable notice and comment. The reason for this is double. First, the book in itself is interesting, and second, it arouses and activates eager interest in the "genre literature" of which Holmes' novels are examples. Nathaniel Hawthorne comes to mind as one who, perhaps more

emphatically than Holmes, struggled with the moral and psychological problems engendered by the apposition of Puritanism and Eros. The theme was common to many of the American writers of that period. However, Holmes was a physician, and that gives special significance to his novels.

Oberndorf abridges and commentates three of them, *Elsie Venner*, *The Guardian Angel*, and *A Mortal Antipathy*. These, according to Oberndorf, are "psychological novels," that is, vehicles which Holmes "deliberately and probably shrewdly chose—as a medium through which to bring his views before the public." In *Elsie Venner* Holmes dwells upon antenatal psychic influences. The mother was bitten by a snake during the time she was pregnant with Elsie. "*The Guardian Angel* is a study of hereditary influences on the mind of one individual and on the development of hysterical symptoms" (p. 16). "*A Mortal Antipathy* is the study, *by a fine psychiatrist*, of a compulsion type of morbid fear"(p. 17). Oberndorf rather successfully demonstrates that these novels reflect an extensive "appreciation" of psychiatric dynamisms. But to this reviewer's mind, he does not prove that Holmes wrote these novels as "a fine psychiatrist," nor that Holmes deliberately chose fiction as the medium for the presentation of his *psychiatric* views in order to escape the antagonism of his medical colleagues. The more likely explanation is that Holmes was troubled in his thinking about life, and "worked it out" in fiction. After all, such is the genesis of the best psychological novels, and, according to Aristotle, also the origin and function of *drama*.

We have Holmes' own words to support this interpretation, and also the judgment of his biographer, John T. Morse, Jr. According to the latter, the possibility of prenatal poisoning interested Holmes as a sort of fine fancy, but his earnest concern "was to raise the question of its effect upon the moral responsibility of the unhappy recipient of the envenomed instincts"[1] (p. 263). In the second Preface for *Elsie Venner* (1883) Holmes wrote that his "poor heroine found her origin, not in fable or romance, but in a physiological conception fertilized by a theological dogma." The theological dogma was that of moral responsibility.

Dr. Oberndorf in a tangential manner links Holmes to Freud, pointing to a definite parallelism between the two. He bolsters this linkage with quotations drawn from Holmes' Oration delivered in 1870 (not in 1871 as Oberndorf states) before the Phi Beta Kappa Society of Harvard.

The parallelism of Holmes and Freud can be accepted without dispute, but an objective reading of Holmes' essay *Mechanism in Thought and Morals*[2]

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[1] Morse, Jr., John T. "Life and Letters of Oliver Wendell Holmes." 2 vols. Boston and New York, Houghton Mifflin and Company, 1896.

[2] Holmes, Oliver Wendell. *Mechanism in Thought and Morals*. An Address delivered before the Phi Beta Kappa Society of Harvard University, June 29, 1870. With Notes and Afterthoughts. Boston, James R. Osgood and Company, 1871.

compels one to a more modest estimate of Holmes' competence as a clinical psychiatrist than is claimed on his behalf by Oberndorf. Holmes appears to have believed that: "The seat of the *will* seems to vary with the organ through which it is manifested" (p. 24). He reports on some experiments in which, by means of his 'horse-timer'—that is, a chronometer marking quarter seconds—he tested the "speed of the transmission of sensations in a circle of students who joined hands so as to represent a nervous circle of about 66 feet." He timed the speed with which an initial squeeze of the hand was transmitted ten times round the circle "traversed 660 feet, besides involving 100 perceptions and volitions" (p. 27). From much experimentation Holmes concludes: "Nothing could be easier than to calculate the whole number of perceptions and ideas a man could have in the course of a lifetime" (p. 29). He quotes Dr. Hooke, the famous English mathematician and philosopher, who estimated the number of separate ideas the mind is capable of entertaining at 3,155,760,000 (p. 29).

A good deal of what Holmes refers to under the heading of *Unconscious* refers in actuality to the operations of the automatic nervous system. Reading some portions of Holmes' Oration one is persuaded to credit him with some very deep insights into psychiatric mechanisms. But all too often his profound observations are followed by comments which dissipate the favorable impression. Thus Holmes reports an experiment which he carried out on himself involving the inhalation of ether. He experienced a great exaltation, and he attempted to write out a description of the quality of this exalted feeling. All that he was able to set down in writing was the following sentence: "*A strong smell of turpentine prevails throughout.*" Speculative analysts would find this sentence a juicy bone to chew on, and Holmes, himself, says of this sentence: "Children may smile, but the wise will ponder" (p. 47). And yet, following this revelation, comes this comment: "My digression has served at least to illustrate the radical change which a slight material cause may produce in our thoughts, and the way we think about them" (p. 47). Holmes, the anatomist, appears to have believed that the brain grows in size as the intellect extends. And yet Holmes wrote these pregnant sentences: "There are thoughts which never emerge into consciousness, which yet make their influence felt among the perceptible mental currents, just as the unseen planets sway the movements of those which are watched and mapped by the astronomer. Old prejudices, that are ashamed to confess themselves, nudge our talking thought to utter their magisterial veto. In hours of languor, as Mr. Lecky has remarked, the beliefs and fancies of obsolete conditions are apt to take advantage of us. We know very little of the contents of our minds until some sudden jar brings them to light, as an earthquake that shakes down a miser's house brings out the old stockings full of gold, and all the hoards that have hid away in holes and crannies" (p. 44).

At the end of his Oration, Holmes expressed his Credo in the following terms: "I reject the mechanical doctrine which makes me the slave of outside influences. Moral chaos began with the idea of transmissible responsibility" (p. 81). With righteous zeal Holmes proclaimed: "If a created being has no rights which his Creator is bound to respect, there is an end to all moral relations between them" (p. 85). These were the real preoccupations of Holmes.

The aforegoing is presented not in any way to take issue with Oberndorf's thesis, but rather to contribute a little to that which I hope will grow and develop—by virtue of Oberndorf's excellent contributions—namely, the critical and psychological interpretation of the motives and products of the men who created the distinctive American literature of the middle of the last century.

IAGO GALDSTON.

WILLARD MARMELSZADT. *Musical Sons of Aesculapius.* With a foreword by Victor Robinson. New York: Froben Press. 1946. 115 pp. 16 plates. $3.00.

The foreword to this book was one of the last things which Victor Robinson wrote and thus it might be said that to his last days Dr. Robinson continued to stimulate young physicians and medical students to pursue the study of medical history. This little book lacks the eloquence and thoroughness of professional writing, but medical historians and the musical amateurs among them will be pleased to learn that much of it was written while the author was a student and that the remainder was prepared while he was occupied with the many duties of a naval officer.

The section on ancient history is far from complete and begins in the Christian era. If the author had investigated Boerhaave further, he would have found in his *Impetum Faciens*, "I do not know if all that one tells us of the charms and enchantments could not be attributed to the effects of music, in which the ancient physicians were well versed." Asclepiades, Celsus, Avicenna, and Johannes Actuarius were sufficiently moved by music to prescribe it for their patients.

The early part of the book is largely a catalogue of great and near-great physicians who found pleasure in music, but at Berlioz and Borodin the author pauses for interesting vignettes. The last few chapters are devoted to American physicians at home and in their orchestras, all of which is an attempt to controvert Darwin's conception "that the pursuit of science is necessarily associated with an atrophy of the aesthetic faculties."

SIDNEY LICHT.

NOTE: The Editors wish to point out an unfortunate mistake occurring in

Dr. Marmelzadt's book which, if accepted uncritically, may result in a medico-historical myth. On pp. 24-25 it is stated that Paracelsus, in addition to his medical activities, achieved fame as an "organist, composer, and instrument builder." Inspection of the evident source of this information (Karl Sudhoff, Hohenheim's musikalische Kenntnis, *Münch. Med. Wchnschr.*, 1937, 84: 543-4) reveals that Sudhoff was actually discussing an organist named Paul Hofhaimer, whom Paracelsus mentioned in one of his books. Paracelsus, himself, was not a musician.

SIDNEY LICHT. *Music in Medicine.* With a Foreword by Alexandre Tansman. Boston, Massachusetts: New England Conservatory of Music, 1946. 132 pp. $3.00.

Based upon a series of lectures delivered to students of the New England Conservatory of Music, Dr. Licht has written a book primarily for musicians who wish to learn how they may work with physicians in healing the sick. In the introduction the author modestly makes no claim for originality or perfection in his undertaking, merely expressing the hope that, by using an unemotional approach to the subject of music and medicine, he may furnish a guide to those who might wish to engage in a field which is as yet in an embryonic state. There is stressed the importance and necessity of applying scientific criteria and the analytic method in judging the worth of music as a therapeutic agent in any field or specialty of medicine. Dr. Licht soberly warns of the ever-present danger that, should any method other than the scientific analytical one be used in such an evaluation, the resulting claims for remarkable cures which are sure to result will quickly be viewed with suspicion and distrust by physicians. The use of emotional approaches in considering the merit of utilizing the tonal arts in the treatment of disease can but lead to the classification of musical therapy as a healing cult. This can not be tolerated or endorsed by doctors who are certain to insist upon a rigid set of standards which a solely emotional appraisal can not satisfy. The author points out that there are many valuable uses of music in medicine. This book has been written with a view of preserving for medicine that which is of value for patients—that which physicians will come to realize and appreciate as scientifically sound and good medical practice.

Dr. Licht first sketches the history of music as a therapeutic modality in medicine. By citing examples selected from prehistoric times, the Greek and Roman periods, the early Christian era, the Renaissance, and more recent periods in history, he shows that in all ages there have been great numbers of purported wondrous cures, often bordering on the miraculous. However, by reconsidering the situation in the light of present-day physiological concepts, he shows that in each case these medical "cures" do not stand up

under scientific scrutiny. Explanations for the "cures" caused by music are offered, it being shown that in many of the classical cases which abound in the literature of all periods of history, there may have been other factors at work—most often pure coincidence, in which the nature of the disease itself was such that recovery of the patient was entirely possible and probable, sans the superfluous magical charms of music. Actually, the first chapter of this book is the only one solely devoted to the history of medicine, although examples showing the antiquity of certain musical procedures as remedial agents are used in subsequent more technical chapters.

Next Dr. Licht discusses the philosophy and psychology of music. With the precision of a laboratory research worker, he considers the elements of music and explains the variations in response to such physical elements as pitch, intensity, timbre, duration, rhythm, melody, mode, key, tempo, and sonority. The variable effects of composition upon the psyche and emotional pattern reactions are noted together with a review of the literature which records the findings of a number of workers in this field. Evidence as to the possible physiologic action of music on the soma is presented. Emphasis is given to the especial importance of the human voice as a factor in eliciting an emotional response. Prophylactic caution is given to the musician who wishes to work in the field of music as applied to medicine, that in his work there is really no such thing as good music or bad music—that the evaluation of the good in music is a highly personalized phenomenon.

In chapters on "Occupational Therapy" and "Music in Bed" there is presented technical information concerning specific remedial uses to which various musical instruments and techniques may be put in different diseases, injuries, and their sequelae. When one has read the chapters on "Music in Bed" and "Diversion and Entertainment" he is left with the feeling that the hospital which does not have a full-time musical director, a musical aide, and a formal program designed to integrate all types of patients into the program, is lacking, indeed, in a necessary department. In offering concrete suggestions as to equipment, organization of a record library, and methods of developing a full program to encompass all diseases in which the patients can actively participate, Dr. Licht has actually formulated what might be termed a "Musical Pharmacopoeia."

The use of music in the treatment of mental disorders is perhaps as old as the musical and medical arts themselves. In the chapter on "Psychiatry and Music" the author presents the claims which have been made for music as an aid for those who are mentally ill, but repeats that a cautious appraisal be made. The valuable uses of music by listening, by participation, and by the playing of instruments are listed. This chapter might well serve additionally as a timely antidote for the toxic enthusiasms which may have been liberated among those of the uninformed laity, who within the past six months have read newspaper articles throughout the nation—articles which described

how a psychotic musician was able to play again, articles which used terms such as "mad pianist," "Mysterious Mr. X," together with descriptions of the performances, photographs, etc.—and always with the inherent danger that a considerable segment of the public will grab on hopefully to a "new" procedure, "musical cures," as a cure-all for mental diseases. It seems to this reviewer that Dr. Licht may have had these recent occurrences in mind when he wrote of the caution to be used in the approach and technique to be followed in the use of music as applied to psychiatry.

In the concluding section of the book the desirability of the term "musical aide" over other terms as applied to those who work with music in hospitals is explained. Dr. Licht concludes by suggesting an ambitious projected curriculum, leading to the degree of bachelor of music in medical practice, which could be offered by a music school in conjunction with a medical college. Such a curriculum would, indeed, be a novel one, encompassing within the period of a four year course, the study of both theoretical and practical subjects related to the fields of music and medicine. Although Dr. Licht calls the field of music as applied to medicine an "uncharted venture," he has in his book supplied a blue-print for the establishment on a sound scientific basis of the tonal arts as useful instruments in medical therapy.

WILLARD LEE MARMELZAT.

BERNHARD J. STERN. *Medicine in Industry*. New York: The Commonwealth Fund, 1946. 209 pp. $1.50.

In this contribution to the New York Academy of Medicine studies on Medicine and the Changing Order, Professor Stern has brought to bear on health services in industry a broad background in sociology and the history of medicine.

As Dr. Reznikoff states in the Preface, the volume presents "an objective and lucid exposition" in a difficult field "beset with polemics." But it is far more than an exposition. It is a critical analysis of the historical development of medical services in industry and the numerous pressures guiding their course. It is a succinct presentation of the main features of the field today and the immediate issues surrounding it.

Professor Stern begins with a brief account of the development of knowledge on occupational diseases. Recognizing the benefits of specialization, he points out limitations in its way of restricting the views of industrial medicine to ailments associated with the job, rather than the health of the worker in his total community setting. Tracing social and legislative developments, we see a path of progress but one that has wound slowly through a field marked by many obstacles, political and economic. The analysis of the jurisdictional conflicts between labor and health agencies in the administration of industrial

hygiene may fall somewhat short of recognizing the practical administrative aspects of this question.

The chapter on industrial disability points out the relation of disability to earnings and its dependence chiefly on illness of non-occupational origin. There is a brief discussion of the problem of the handicapped worker and programs under way to rehabilitate him. A panoramic view is given of the content of preventive health services in industry, constituting the usual programs of industrial hygiene, and their extent in large and small plants. Professor Stern minces no words in describing the deficiencies, which he attributes mainly to the failure of management to recognize the social and the financial value of human conservation. The role of government, trade unions, and voluntary agencies in stimulating expanded programs is described. Some might claim that the responses of management give greater cause for pride than in Professor Stern's judgment.

Perhaps the most valuable section of the book is the discussion on medical care and group insurance plans in industry. Professor Stern has subjected a mass of complex and confusing material to an analysis which tells the story in about as simple and clear terms as it can be found anywhere. The book closes with a discussion of some of the controversial issues surrounding the status and relationships of the industrial physician. The seamy side of the work, associated as it sometimes is with anti-labor policies or workmen's compensation rackets, is brought into full view. The need for better training of industrial physicians is emphasized.

Some might claim that *Medicine in Industry* is too critical of accomplishments in the field. The special feature of the study, however, is that it presents the development of industrial medicine clearly from the point of view of labor—a perspective not common in the literature. When major attention is focused on the health needs of the working man, as an individual, rather than of industry as a production enterprise, it is obvious that deficiencies will appear most glaring.

For the reader not deeply familiar with industrial medicine, Professor Stern's study renders a high service by not only cataloging accomplishments in the field, their historic development, and the degree by which they fall short of practical goals, but also by highlighting the key issues around which current discussion and action revolve. The references provide a helpful body of literature for further exploration. For the reader intimately acquainted with industrial medicine, the analysis will prove stimulating and provocative.

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